3.5 Transportation

This section describes the existing transportation infrastructure along S.R. 108 including the existing roads and transit system. The transportation impact analysis area includes the roads that intersect S.R. 108 and the transit that currently operates on S.R. 108. This section also includes a description of the existing level of service of other roadways that intersect or parallel S.R. 108.

3.5.1 Roadway System

The roadway system in the area of S.R. 108 consists of a series of east-west and north-south arterials and collectors. The only continuous north-south transportation facilities in the area besides S.R. 108 are I-15 and S.R. 126, which are both about 2 miles to the east. The main types of roads in the area are arterials, collectors, and local roads.

- Arterials. An arterial is a street with traffic signals whose primary purpose is to serve through traffic and whose secondary purpose is to provide access to adjacent properties.
- Collectors. The collector street system provides access to
 properties and allows traffic to travel through residential
 neighborhoods and commercial and industrial areas. It differs
 from the arterial system in that collector streets can extend into
 residential neighborhoods in order to distribute traffic from the
 arterials to its ultimate destination.
- Local Roads. The local street system consists of all facilities
 that are not one of the systems noted above. It primarily allows
 direct access to adjacent properties and connections to arterials
 and collectors. It offers the lowest level of mobility and usually
 contains no bus routes. Through traffic is generally discouraged
 from using local roads.

Exhibit 3.5-1 below shows the existing operating conditions of the north-south and east-west roadways in the transportation impact analysis area. Exhibit 3.5-2: Existing Roadway Network on page 3-62 shows the locations of these roadways.

What is level of service?

Level of service, or LOS, is a method of describing the congestion level of a street or freeway using a letter "grade" from A to F. LOS A represents excellent traffic conditions and LOS F represents heavy congestion. For more information, see Section 1.4.3, Current and Future Traffic Congestion.

Exhibit 3.5-1: Existing Roadway Network in 2005

Roadway (County)	Roadway Type	Number of Travel Lanes	Average Annual Daily Traffic ^a	Level of Service
North-South Roads				
I-15	Principal arterial – freeway	6	105,270	Е
S.R. 126	, Minor arterial	4	38,175	Е
1000 West (Davis)	Collector	2	11,175	D
2700 West (Weber)	Collector	2	1,000 ^b	Α
4500 West (Davis)	Collector	2	2,250	Α
5900 West (Weber)	Collector	2	2,240	Α
Bluff Road	Local	2	1,280	Α
East-West Roads				
Antelope Drive	Minor arterial	2	24,355	F
200 South (Davis)	Minor arterial	2	4,840	Α
300 North (Davis)	Collector	2	11,400	D
800 North (Davis)	Collector / local	2	10,305	D
1800 North (Davis)	Minor arterial	2	12,505	D
2300 North (Davis)	Collector	2	4,000 ^b	Α
5500 South (Weber)	Minor arterial	2	17,715	Е
4800 South (Weber)	Collector / local	2	15,885	Е
4000 South (Weber)	Collector	2	8,160	С

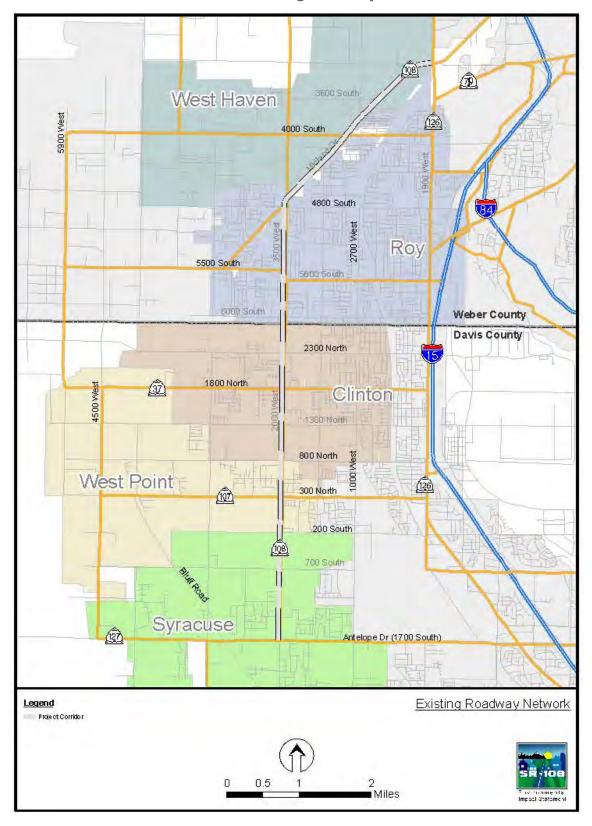
 $^{^{\}circ}$ 2005 annual average daily traffic (AADT) based on UDOT Traffic on Utah Highways

As shown in Exhibit 3.5-1 above, 11 of the 16 roads that intersect or parallel S.R. 108 operate at an acceptable level of service of LOS D or better. Of the roads that intersect S.R. 108, only Antelope Drive, 5500 South, and 4800 South operate at an unacceptable level of service of LOS E or LOS F.

^b Modeled AADT volumes

108

Exhibit 3.5-2: Existing Roadway Network



3.5.2 **Transit System**

Mass transit service is provided by UTA, which operates throughout Davis, Weber, and Salt Lake Counties as well as more distant counties in the Wasatch Front region. Existing transit service consists of scattered bus routes that serve the suburban areas surrounding S.R. 108. UTA Route 626 provides approximately hourly service along S.R. 108 between the Weber State University Davis Campus and about 6200 South (Weber County) with frequent stops on S.R. 108.

In the future, bus service will likely spread and serve more of the area surrounding S.R. 108. Commuter rail is planned to parallel S.R. 108 between S.R. 126 and S.R. 108. Commuter rail is scheduled to open in late 2008 and is projected to provide high-speed transit service every 20 minutes in the peak periods and every 40 minutes in the off-peak periods between Weber and Salt Lake Counties.

Economic Conditions 3.6

This section examines the economic conditions in the S.R. 108 economic impact analysis area. The economic impact analysis area includes Weber and Davis Counties, the cities along S.R. 108, and the businesses adjacent to the roadway that could experience adverse or beneficial impacts from construction and operation of an improved S.R. 108. Data were reviewed on commercial and industrial activities, employment, wages, and income to provide an overview of the existing economic conditions in the economic impact analysis area.

The cities along S.R. 108—Syracuse, West Point, Clinton, Roy, and West Haven—have all experienced commercial growth along S.R. 108. In addition, Davis and Weber Counties have experienced growth in households, employment, and income. The land use plans for the cities along S.R. 108 show that the cities are planning for continued near- and long-term residential and commercial growth along S.R. 108 over the next 20 years.

Businesses along S.R. 108 primarily consist of service, office, and retail businesses. In recent years, growth in retail commercial developments has occurred throughout the corridor, but particularly in Syracuse and West Point.

What transit is currently present along S.R. 108?

Transit along S.R. 108 consists of one bus route, 626, which provides service to Weber State University.

3.6.1 Employment and Income Trends

Exhibit 3.6-1 provides data on employment in Weber and Davis Counties and in the Wasatch Front Multi-County District (MCD), which includes Davis, Morgan, Salt Lake, Tooele, and Weber Counties. Overall, employment in these areas has increased considerably since 1990. Between 1990 and 2000, employment in the Wasatch Front MCD increased by 33%. In Weber and Davis Counties, employment increased by 32% and 42%, respectively. In Roy, Clinton, West Point, and Syracuse, employment levels increased by 41% to 127%. Forecasts from the Utah Governor's Office of Planning and Budget project that employment will continue to grow by up to 35% in the MCD between 2005 and 2020.

What agency is responsible for forecasting economic trends?

For Utah, the Governor's Office of Planning and Budget forecasts economic indicators such as population, employment, and household growth.

Exhibit 3.6-1: Current and Forecasted Employment

		Employment			Percent Change			
Area	1990	2000	2005	2020 (Projected)	1990–2000	2000–2005	2005–2020 (Projected)	
Utah	900,419	1,340,109	1,482,410	2,084,097	49%	11%	41%	
Wasatch Front MCD	526,275	698,404	955,714	1,289,105	33%	37%	35%	
Weber County	73,666	97,119	113,112	150,864	32%	17%	33%	
West Haven	NA	1,912			_	_		
Roy	11,342	16,002	_	_	41.1%	_	_	
Davis County	82,803	117,852	136,174	174,133	42%	16%	28%	
Clinton	3,242	6,201		_	91.4%	_		
West Point	1,673	2,786	_	_	66.5%	_	_	
Syracuse	2,005	4,551	_	_	127.0%	_	_	

Sources: Utah Governor's Office of Planning and Budget 2006a, 2006b; U.S. Census Bureau 2006b NA = Data not available

As shown in Exhibit 3.6-2 below, unemployment in the Wasatch Front MCD and in Weber and Davis Counties decreased between 1990 and 2000 but rose between 2000 and 2004, following the same trend as the state overall. By 2004, the unemployment rates in Weber and Davis Counties were 5.4% and 4.4%, respectively.

Exhibit 3.6-2: Unemployment Rates

Area	1990	2000	2004
Utah	4.3%	3.3%	4.7%
Wasatch Front MCD	4.0%	3.2%	4.8%
Weber County	5.0%	4.2%	5.4%
Davis County	3.8%	3.1%	4.4%

Source: Utah Governor's Office of Planning and Budget 2006b

Exhibit 3.6-3 shows the payroll employment by nonagricultural sector of the state economy for 2004. The Wasatch Front MCD includes 58% of the state's nonagricultural employment, and Weber and Davis Counties include 16% of the state's nonagricultural employment (see Exhibit 3.6-4 below). These numbers demonstrate that the counties in this region contribute substantially to the state's economy.

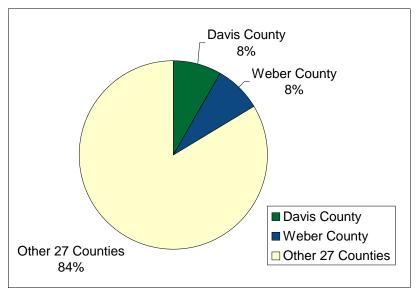
The large services sector, which includes professional and business, education and health, leisure and hospitality, and other services, includes about one-third of the overall employment in the state, the Wasatch Front MCD, and the counties in the impact analysis area. The trade, transportation, and utilities and government sectors also account for a large portion of the employment in the region.

Exhibit 3.6-3: Nonagricultural Payroll Employment by Industry Sector in 2004

Industry Sector	Utah	Wasatch Front MCD	Weber County	Davis County
Mining	7,083	1,848	12	118
Construction	72,631	44,608	5,218	7,493
Manufacturing	114,765	63,378	11,773	10,462
Trade, transportation, utilities	219,212	132,304	16,538	19,431
Information	30,272	20,131	1,668	880
Finance	65,040	47,911	4,178	3,831
Professional and business services	138,220	93,500	9,717	8,220
Education and health services	123,282	62,236	9,951	8,319
Leisure and hospitality	102,031	52,825	7,735	8,291
Other services	32,915	20,550	2,724	2,775
Government	198,877	106,736	19,713	23,433
Total nonagricultural employment	1,104,328	637,151	89,227	93,253

Source: Utah Governor's Office of Planning and Budget 2006b

Exhibit 3.6-4: Nonagricultural Employment in Davis and Weber Counties in 2004



Source: Utah Governor's Office of Planning and Budget 2006b

Employment along S.R. 108 consists primarily of government, retail trade, and service-oriented jobs. The Davis County School District operates two schools—Syracuse Junior High School and Syracuse Elementary School—along S.R. 108. The district opened a new high school (Syracuse High School) on S.R. 108 in 2007. Other large employers along S.R. 108 are several retail businesses including a Wal-Mart store that usually employs between 225 and 350 people. Two new Wal-Mart stores are currently under development along S.R. 108.

Weber and Davis Counties are home to several large employers as shown in Exhibit 3.6-5 below. Hill Air Force Base, which employs between 10,000 and 15,000 people, is the largest employer in Davis County and one of the largest in Utah. It is located about 2 miles east of S.R. 108 in the neighboring city of Layton. The public sector, which includes various government agencies and public education institutions, is also among the largest employers in the area. With the exception of two of the Davis County schools in Syracuse and the Weber State University West Center in Roy, the large employers listed in Exhibit 3.6-5 are not located on S.R. 108. However, S.R. 108 provides an important connection to employment centers throughout Davis and Weber Counties.

Exhibit 3.6-5: Largest Employers in Weber and Davis **Counties in 2005**

Name	Industry	Employees
Weber County		
Internal Revenue Service	Federal government	5,000–6,999
Weber County School District	Public education	3,000–3,999
Autoliv	Motor vehicle equipment manufacturing	2,000–2,999
McKay-Dee Hospital	Hospital	2,000–2,999
Weber State University	Higher education	2,000–2,999
Davis County		
Hill Air Force Base	Air base/federal defense	10,000–14,999
Davis County School District	Public education	5,000–6,999
Lagoon Corporation Inc.	Amusement and theme park	1,000-1,999
Lifetime Products Inc.	Sports and athletic equipment manufacturing	1,000–1,999
Smith's Marketplace Distribution	Distribution center	1,000–1,999

Source: Utah Department of Workforce Services 2005

As with employment and wages, personal income and per-capita income in Weber and Davis Counties also increased between 2000 and 2004 as shown in Exhibit 3.6-6. Total personal income ranked third in the state for Davis County and fourth for Weber County.

Exhibit 3.6-6: Income and Wages

	Weber County			Davis County		
Income Type	2000	2004	Percent Change	2000	2004	Percent Change
Total personal income (millions) Per capita personal income	\$4,593 \$25,066	\$5,531 \$27,914	20.4% 11.4%	\$6,024 \$23,360	\$7,297 \$26,551	21.1% 14.1%

Source: U.S. Department of Commerce, Bureau of Economic Analysis 2006

3.6.2 Commerce

S.R. 108 is becoming an economically valuable transportation corridor of local and regional importance. It provides a local connection between the cities along the roadway and a regional connection to communities in Weber and Davis Counties. As a local connection, S.R. 108 provides access for local shopping alternatives, professional services, and public education. As a regional connection, S.R. 108 serves as a major link to employment destinations and to the larger regional transportation network.

Representatives from the cities along S.R. 108 stated that they plan for the roadway to serve as both a primary and secondary commercial corridor (S. Anderson 2006a; Larson 2006a; Vinzant 2006; Worthen 2006). Future land use plans adopted by the cities along S.R. 108 show that the cities expect continued commercial development of the corridor over the next 10 to 20 years. To facilitate commercial development, the cities have recommended in their respective transportation, land use, or general plans that S.R. 108 should be widened to accommodate the anticipated commercial growth along S.R. 108 and to reduce congestion that could limit the economic vitality of businesses along S.R. 108.

The commercial importance of the roadway can best be demonstrated by the recent expansion of businesses. There are currently about 80 businesses immediately adjacent to S.R. 108, many of which have opened in recent years. A Wal-Mart store also recently opened in Clinton, and two more stores are planned in Syracuse and West Haven. An Albertson's grocery store and accompanying retail development are also located in Clinton. Other businesses along S.R. 108 include a number of retail and restaurant chains, several medical offices, and a variety of locally owned retail businesses. The cities have noted that safe and efficient access to commercial areas will be crucial to maintaining and promoting economic growth in the cities along S.R. 108.

Many cities have come to rely heavily on local sales taxes from businesses to provide municipal revenue. These taxes are also a measure of the economic activity in a community. Each of the cities along S.R. 108 has adopted a local option sales tax which generates revenues from retail businesses. The cities of Clinton, Roy, Syracuse, and West Haven generate significant revenues from local businesses.

What are the future economic plans for the S.R. 108 corridor?

Representatives from the cities along S.R. 108 stated that their long-range plans include making the S.R. 108 corridor a primary or secondary commercial area for the city.

The city of West Point currently has no taxable properties to generate sales taxes but is expecting to have commercial businesses within the next 12 to 24 months (Harper 2006).

As shown in Exhibit 3.6-7, sales tax revenue from retail and other commercial businesses along S.R. 108 has increased considerably in recent years (by 13% to 79%) as S.R. 108 has become a center for retail activity. As a result, the S.R. 108 corridor is an important source of revenue for the communities.

Exhibit 3.6-7: Local Option Sales Tax Revenues

City	2001	2005	Percent Change
Clinton	\$923,677	\$1,653,703	79%
Roy	\$3,074,728	\$3,467,306	13%
Syracuse	\$929,618	\$1,366,078	47%
West Haven	\$591,890	\$895,861	51%
West Point ^a	_	_	_

Source: University of Utah, Center for Public Policy and Administration 2006

3.7 **Joint Development**

Under FHWA guidelines (Technical Advisory T6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents), an agency developing a project that uses federal money should identify and discuss those joint development measures that will preserve or enhance an affected community's social, economic, environmental, and visual values. As required by that guideline, this section discusses proposed recreation and public works projects that might be developed jointly with the proposed action.

3.7.1 **Clinton City Trail**

The City of Clinton's administrative facilities, a city park, and an elementary school are located in a complex at about 1150 North on the eastern side of S.R. 108. In its land use plan, the City shows an existing canal trail on the west side of S.R. 108 connecting to the city's administrative facilities and the recreational facilities on the east site. The City has requested that a pedestrian underpass across S.R. 108 be designed and analyzed as part of this EIS process. Once the City obtains funding, it plans to construct the underpass.

What is joint development?

Joint development is a term used by FHWA which, in this context, encompasses opportunities and expected impacts that are also addressed elsewhere in this EIS (for example, opportunities to construct pedestrian and bicycle trails).

^a Information not available for West Point

3.8 Pedestrian and Bicycle Resources

This section identifies current and proposed pedestrian and bicycle facilities in the pedestrian and bicyclist impact analysis area. The pedestrian and bicyclist impact analysis area is the area within one-half mile of S.R. 108 because this is where direct and indirect impacts from the proposed improvements would likely occur.

The information about current and proposed facilities was collected from city and county planning staff and by reviewing local and regional land use master plans.

The five cities along S.R. 108 do not have their own comprehensive pedestrian and bicycle facility plans. WFRC developed the Wasatch Front Urban Area Long-Range Transportation Plan to address communities' needs regarding pedestrian paths and bicycle routes through 2030 as well as many other transportation needs for the Wasatch Front (WFRC 2003). The plan incorporates the Weber and Davis County trail master plans as well as individual community plans. These community plans identify facilities for bicycle travel within street rights-of-way as well as separate paths or trails that will need to be considered when routes are designed and street and other improvements are constructed (WFRC 2003).

3.8.1 Existing Facilities

Currently, there are no established bicycle routes or bicycle lanes along S.R. 108. Sidewalks along S.R. 108 are generally discontinuous, and where sidewalks exist they were built as part of recent residential and commercial development. Walking and riding routes for students are often disturbed by frequent construction and alteration of sidewalks along S.R. 108 (Bond 2006). See Section 3.3.6.2, School Safety, for more information.

The most recent trail map provided by the City of Clinton shows that the existing Clinton Creek trail on 2050 North crosses S.R. 108. The City plans to encourage bicycle and pedestrian use of this trail by slightly realigning the trail and constructing a proposed underpass at the intersection of S.R. 108 and 2050 North. No other existing trails cross or connect to S.R. 108 in Davis County, and no existing trails cross or connect to S.R. 108 in Weber County.

What pedestrian and bicycle facilities currently exist along S.R. 108?

Currently, there are no established bicycle routes or bicycle lanes along S.R. 108. In addition, the sidewalks along S.R. 108 are generally discontinuous.

Proposed Facilities 3.8.2

Exhibit 3.8-1 shows the locations of proposed facilities in the impact analysis area.

Exhibit 3.8-1: Proposed Facilities in the Pedestrian and **Bicyclist Impact Analysis Area**

	Intersection or Connection with		
City	S.R. 108	Name of Facility	Facility Location
West Point	Connects to S.R. 108 at 200 South	Not yet named	Within S.R. 108 right-of-way ^a
Syracuse	Connects to S.R. 108 at 1200 South and 1700 South	Not yet named	Within S. R. 108 right-of-way ^a
Clinton	Intersects S.R. 108 at 2050 North	Clinton Creek Trail	Underpass ^b
West Haven	Connects to S.R. 108 at 4500 South	Power Line Corridor Trail	Within S.R. 108 right-of-way ^a

Sources: WFRC 2003; Davis County 2006b; City of Clinton 2007

 $^{^{\}rm a}$ These facilities are planned within the S.R. 108 right-of-way and would connect to the improved pedestrian and bicycle facilities on S.R. 108.

^b Proposed underpass at the intersection of S.R. 108 and 2050 North.

3.9 Air Quality

This section describes the existing air quality in the S.R. 108 air quality impact analysis area. Because the S.R. 108 project would be located in Davis and Weber Counties, these counties make up the impact analysis area for the air quality analysis.

Air quality in a given area depends on several factors such as the area itself (size and topography), the prevailing weather patterns (meteorology and climate), and the pollutants released into the air. Air quality is described in terms of the concentrations of various pollutants in a given area of atmosphere (for example, parts per million or micrograms per cubic meter).

3.9.1 Regulatory Basis for Air Quality Analysis

3.9.1.1 National Ambient Air Quality Standards (NAAQS) Requirements

National Ambient Air Quality Standards (NAAQS) include both primary and secondary standards. Primary standards protect public health, while secondary standards protect public welfare (such as protecting property and vegetation from the effects of air pollution). These standards, which are set by the U.S. Environmental Protection Agency (EPA), have been adopted by the Utah Division of Air Quality as the official ambient air quality standards for Utah. The current NAAQS are listed below in Exhibit 3.9-1.

If an area meets the NAAQS for a given air pollutant, the area is called an *attainment area* for that pollutant (because the standards have been attained). If an area does not meet the NAAQS for a given air pollutant, the area is called a *non-attainment area*. A *maintenance area* is a non-attainment area that has not had a recorded violation of the NAAQS in several years and is on its way to being redesignated as an attainment area.

What are attainment, nonattainment, and maintenance areas?

An attainment area is an area that meets (or "attains") the NAAQS for a given pollutant. A non-attainment area is an area that does not meet the NAAQS for a given pollutant. A maintenance area is a non-attainment area that has not had a recorded violation of the NAAQS in several years and is on its way to being redesignated as an attainment area.

Exhibit 3.9-1: National and Utah Ambient Air Quality Standards (NAAQS)

	National (EPA) and Utah Standard ^a			
Pollutant	Primary	Secondary		
Lead (Pb)				
Quarterly average	$1.5 \mu { m g/m^3}$	$1.5 \mu { m g/m^3}$		
Particulate Matter (PM ₁₀)				
Annual arithmetic mean	Revoked ^b	(no standard)		
24-hour average	$150~\mu \mathrm{g/m^{3,c}}$	(no standard)		
Particulate Matter (PM _{2.5})				
Annual arithmetic mean	$15.0\mu\mathrm{g/m^{3,d}}$	$15.0 \mu \mathrm{g/m^3}$		
24-hour average	$35 \mu { m g/m^{3,e}}$	(no standard)		
Sulfur Dioxide (SO ₂)				
Annual average	0.03 ppm	(no standard)		
24-hour average	0.14 ppm	(no standard)		
3-hour average	(no standard)	0.50 ppm		
Carbon Monoxide (CO)				
8-hour average	9 ppm (10 mg/m³)	(no standard)		
1-hour average	35 ppm (40 mg/m³)	(no standard)		
Ozone (O ₃)				
8-hour average	0.08 ppm	0.08 ppm		
1-hour average ^c	0.12 ppm	0.12 ppm		
Nitrogen Dioxide (NO ₂)				
Annual average	$0.053 \text{ ppm } (100 \mu\text{g/m}^3)$	$0.053 \text{ ppm } (100 \mu\text{g/m}^3)$		

Source: EPA 2007a

Annual standards are never to be exceeded. Short-term standards are not to be exceeded more than 1 day per calendar year unless noted otherwise.

ppm = parts per million

 PM_{10} = particulate matter 10 microns in diameter or less $PM_{2.5}$ = particulate matter 2.5 microns in diameter or less

 $\mu g/m^3$ = micrograms per cubic meter mg/m³ = milligrams per cubic meter

^a Primary standards are set to protect public health. Secondary standards are based on other factors (for example, protecting crops and materials or avoiding nuisance conditions).

 $^{^{\}rm b}$ EPA revoked the annual PM $_{
m 10}$ standard in 2006 (effective December 17, 2006).

^c Not to be exceeded more than once per year on average over 3 years.

^d To attain this standard, the 3-year average of the weighted annual mean PM_{2.5} concentrations from single or multiple community-oriented monitors must not exceed 15.0 μ g/m³.

^e To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed $35 \,\mu\mathrm{g/m^3}$ (effective December 17, 2006).

3.9.1.2 National Environmental Policy Act Requirements

FHWA's guidance for preparing environmental documents (T6640.8A) requires the project sponsor to evaluate air quality in terms of mesoscale and microscale impacts. Mesoscale evaluations analyze regional air quality impacts, while microscale evaluations analyze localized air quality impacts, usually for individual roads or intersections.

3.9.1.3 Conformity Requirements

All states are required to develop a State Implementation Plan, which explains how the state will comply with the requirements of the federal Clean Air Act of 1970. Section 176(c) of the Clean Air Act and the related requirements of the Federal Aid to Highways Act require that transportation plans, programs, and projects that are developed, funded, or approved by the U.S. Department of Transportation and metropolitan planning organizations must demonstrate that such activities conform to the State Implementation Plan. Conformity requirements apply to the specific pollutants for which the area has been designated non-attainment (for example, carbon monoxide or ozone).

According to Section 176(c) of the Clean Air Act, transportation projects are said to "conform" to the provisions of the Clean Air Act if the project, both alone and in combination with other planned projects, does not:

- Create new violations of the NAAQS,
- Increase the frequency or severity of existing violations of the NAAQS, or
- Delay attainment of the NAAQS.

The most recent conformity analysis for the Wasatch Front was prepared in June 2007 (WFRC 2007). The analysis concluded that the 2030 Regional Transportation Plan conformed to the State Implementation Plan for all pollutants in applicable non-attainment or maintenance areas.

In addition, during the project development phase, a project must satisfy detailed "hot-spot" requirements if it is located in a non-

What is a "hot-spot" analysis?

A "hot-spot" analysis is a project-level analysis that looks at localized impacts, such as at intersection crosswalks or residences near a roadway. attainment or maintenance area for carbon monoxide (CO) or particulate matter (PM₁₀) and must comply with the control measures in the State Implementation Plan for PM₁₀ and PM_{2.5}.

3.9.2 **Major Pollutants of Concern**

The major air pollutants of concern for transportation projects are carbon monoxide (CO), particulate matter (PM₁₀ and PM_{2.5}), ozone (O_3) , and nitrogen oxides (NO_x) .

- **CO**, which is emitted by vehicle engines, is a colorless, odorless, poisonous gas that reduces the amount of oxygen carried in the bloodstream by forming carboxyhemoglobin, which prevents oxygenation of the blood. The NAAQS for CO are intended to protect people from adverse health effects; exposure to CO concentrations that meet the NAAQS will not cause elevated carboxyhemoglobin levels. CO is emitted directly into the atmosphere from automobiles with the highest emission levels occurring at slow speeds, in stop-and-go traffic, and at colder temperatures. Since it disperses to non-harmful levels fairly quickly, CO is considered a localized hot-spot pollutant and is the primary pollutant analyzed at the individual project level.
- Particulate matter of concern generally falls into one of two categories: particulate matter with a diameter of 10 microns or less (PM₁₀) and particulate matter with a diameter of 2.5 microns or less (PM_{2.5}). For transportation projects, the primary source of particulate matter is vehicle emissions. Particulate matter has been linked to a range of serious respiratory and cardiovascular health problems.
- O₃ is a secondary pollutant formed when precursor emissions— NO_x and volatile organic compounds—react in the presence of sunlight. O₃ is a major component of photochemical smog. O₃ irritates the eyes and respiratory tract and increases the risk of respiratory and heart diseases.
- NO_x is composed mainly of nitric oxide (NO) and nitrogen dioxide (NO₂). NO is formed in high-temperature combustion processes such as those in internal combustion engines. When NO reaches the atmosphere, most of it oxidizes and produces NO₂, the brown component of photochemical smog.

Why are these pollutants considered to be major pollutants of concern?

Carbon monoxide, particulate matter, ozone, and nitrogen oxides are considered to be major pollutants of concern because they are emitted as vehicle exhaust and are known to have health effects.

3.9.3 Other Pollutants

3.9.3.1 Hazardous Air Pollutants

In addition to the NAAQS, EPA has also established a list of 33 urban air toxics (64 *Federal Register* 38706). Urban air toxics are pollutants that can cause cancer or other serious health effects or adverse environmental effects. Most air toxics originate from human-made sources including road mobile sources, non-road mobile sources (such as airplanes), and stationary sources (such as factories or refineries).

Air toxics are in the atmosphere as a result of industrial activities and motor vehicle emissions. Scientific research has shown that the health risks to people exposed to urban air toxics at sufficiently high concentrations or lengthy durations include an increased risk of contracting cancer, damage to the immune system, and neurological, reproductive, and/or developmental problems (EPA 2000).

To better understand the effects that urban air toxics have on human health, EPA developed a list of 21 mobile-source air toxics (MSAT) including acetaldehyde, benzene, formaldehyde, diesel exhaust, acrolein, and 1,3-butadiene (66 *Federal Register* 17230). EPA assessed the risks of various kinds of exposures to these pollutants.

In July 1999, EPA published a strategy to reduce urban air toxics; in March 2001, EPA issued regulations for automobile and truck manufacturers to decrease the amounts of these pollutants by target dates in 2007 and 2020. Under the March 2001 regulation, between 1990 and 2020, highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde will be reduced by 67% to 76% and on-highway diesel particulate matter emissions will be reduced by 90%. These reductions will be achieved by implementing mobilesource control programs including the reformulated gasoline program, a new cap on the toxics content of gasoline, the national low-emission vehicle standards, the Tier 2 motor vehicle emission standards and gasoline sulfur-control requirements, the heavy-duty engine and vehicle standards, and the on-highway diesel fuel sulfurcontrol requirements (EPA 2000). On February 26, 2007, EPA further tightened the standards related to mobile air toxics and took steps to reduce benzene emissions, limit emissions from cold-start vehicles, and limit emissions from portable gas canisters.

3.9.3.2 **Greenhouse Gases**

The issue of global climate change is an important national and global concern that is being addressed in several ways by the federal government. The transportation sector is the second-largest source of total greenhouse gases in the United States and the largest source of carbon dioxide (CO₂) emissions, the predominant greenhouse gas. In 2004, the transportation sector was responsible for 31% of all CO₂ emissions produced in the United States. The principal anthropogenic (human-made) source of carbon emissions is the combustion of fossil fuels, which account for about 80% of anthropogenic emissions of carbon worldwide. Almost all (98%) of transportation-related greenhouse gas emissions result from the consumption of petroleum products such as motor gasoline, diesel fuel, jet fuel, and other residual fuels.

Recognizing this concern, FHWA is working with other modal administrations through the U.S. Department of Transportation Center for Climate Change and Environmental Forecasting to develop strategies to reduce transportation's contribution to greenhouse gases—particularly CO₂ emissions—and to assess the risks to transportation systems and services from climate changes.

In Utah, the Governor's Blue Ribbon Advisory Council on Climate Change identified measures that the state could take to minimize the impacts of transportation-related greenhouse gas emissions. The recommended measures include reducing vehicle-miles traveled (VMT) through developing and encouraging the use of mass transit, ridesharing, and telecommuting. Other strategies outlined in the report include promoting alternative fuels and hybrid vehicles and vehicle technologies resulting in greater fuel efficiency. In addition, the report encourages an idle-reduction program for school buses and heavy-duty trucks.

The relationship of current and projected Utah highway CO₂ emissions to total global CO₂ emissions is presented in the Exhibit 3.9-2 below. Utah highway CO₂ emissions are expected to decrease by 6.2% between 2006 and 2030. The UDOT Planning Division predicts that statewide VMT will increase by 58% between 2006 and 2030.

Exhibit 3.9-2: Greenhouse Gas Emissions

Global CO ₂ Emissions, 2006 (MMT)°	Utah Highway CO ₂ Emissions, 2006 (MMT)	Projected Utah 2030 Highway CO ₂ Emissions (MMT)	Utah Highway Emissions, Percent of Global Total, 2006 (%)
27,578	16.2	15.2	0.06%

MMT = million metric tons

3.9.4 Climate

Weather directly influences air quality. Important meteorological factors include wind speed and direction, atmospheric stability, temperature, sunlight intensity, and mixing height. The air quality impact analysis area is located along the Wasatch Front at an elevation of about 4,200 feet above sea level.

The Great Salt Lake contributes to weather conditions in the impact analysis area in both winter and summer. In the winter, the water in the lake is warmer than the air. This increases the moisture content of the air, which creates thermal instability that causes "lake effect" storms. As a result, areas surrounding the lake receive more snowfall than more distant areas. In the summer, the Great Salt Lake has a high evaporation rate, which humidifies the air and causes thunderhead clouds to develop.

The lowest average daily temperatures (28 °F [degrees Fahrenheit]) occur in January, and the highest average daily temperatures (78 °F) occur in July. The highest amount of precipitation generally occurs during April, when the average precipitation is 2.6 inches. Average annual precipitation is 15.6 inches. The area receives an annual snowfall of 63 inches (National Weather Service 1997).

Temperature inversions, which are associated with higher air pollution concentrations, occur when warmer air overlies cooler air. During temperature inversions, which typically occur between November and February in the impact analysis area, particulates and CO from stationary and mobile sources can be trapped close to the ground, which can lead to violations of the NAAQS.

How does weather affect air quality?

In the impact analysis area, weather affects air quality primarily through temperature inversions, which trap particulates and CO close to the ground.

^a EIA 2007

The primary pollutants associated with wintertime inversions in Utah are PM₁₀, PM_{2.5}, CO, and sulfur dioxide (SO₂). The Utah Division of Air Quality issues health advisories for sensitive individuals based on the amount of pollutants in the air during an inversion. When a health advisory is issued, those at risk (for example, people with asthma, emphysema, heart disease, or bronchitis) are encouraged to limit outdoor exertion whenever possible. In addition, during inversions people are encouraged to limit their driving, and restrictions can be imposed on burning wood.

3.9.5 **Current Air Quality Status**

The Clean Air Act Amendments of 1990 require that all areas with recorded violations of the NAAQS are designated as non-attainment areas. A State Implementation Plan must be developed for nonattainment areas to identify control strategies for bringing the region back into conformance with the NAAQS. Non-attainment areas are also classified as marginal, moderate, serious, severe, or extreme depending on the severity of the recorded violations. An area classified as marginal will have less time to reach attainment than an area classified as extreme. Maintenance areas are those areas that have been in violation of the NAAQS but have not had a recorded violation in several years and are on their way to being redesignated as attainment areas.

Exhibit 3.9-3 shows the air quality attainment status for motor vehicle-related pollutants in the impact analysis area.

Exhibit 3.9-3: Air Quality Attainment Status for Motor Vehicle–Related Pollutants in the Air Quality Impact Analysis Area

Non-attainment Area	Status	Pollutant
Davis County		
Davis County	Maintenance area	Ozone (O ₃)
Weber County		
Ogden Ogden	Moderate non-attainment area Maintenance area	Particulate matter (PM ₁₀) Carbon monoxide (CO)

Source: State of Utah 2007

As shown in Exhibit 3.9-3 above, Davis County is classified as a maintenance area for O₃, and Ogden in Weber County is classified as a moderate non-attainment area for PM₁₀ and a maintenance area for CO. With the exception of O₃, the S.R. 108 project corridor meets the NAAQS for all priority pollutants. The Wasatch Front region is currently in attainment for the new 8-hour ozone standard. Davis and Weber Counties always met past state requirements for ozone-related emissions (that is, pollutants that are precursors to ozone). Projections for the Wasatch Front indicate a steady decrease in ozone-related emissions from mobile sources.

The expected air pollutants associated with the existing project corridor are wind-blown dust and particulates from exposed soils and agricultural tilling practices and vehicle emissions (primarily CO) from traffic on existing highways in the area.

The Utah Division of Air Quality maintains a network of air quality monitoring stations throughout the area. In general, these monitoring stations are located where there are known air quality problems, so they are usually in or near urban areas or close to specific emission sources. Other stations are located in remote areas to provide an indication of regional air pollution levels.

Exhibit 3.9-4 through Exhibit 3.9-9 below show the monitoring results for priority pollutants from 2001 through 2005 at the monitoring stations in Davis and Weber Counties.

Exhibit 3.9-4: Summary of CO Monitoring Data for **Davis and Weber Counties**

Station	Parameter	2005	2004	2003	2002	2001
Davis County						
Bountiful (65 West 300	Peak 1-hour value (ppm)a	NA	NA	3.7	4.3	5.9
South, Bountiful)	Peak 8-hour value (ppm)b	NA	NA	2.3	2.0	2.6
	Days above standard	0	0	0	0	0
Weber County						
Ogden (2540 South	Peak 1-hour value (ppm)	16.8	21.2	6.1	9.0	22.2
Washington Blvd.,	Peak 8-hour value (ppm)	5.3	6.6	4.1	4.5	6.2
Ogden)	Days above standard	0	0	0	0	0
Washington Terrace	Peak 1-hour value (ppm)	NA	NA	4.4	5.2	4.8
(4601 South 300 West,	Peak 8-hour value (ppm)	NA	NA	2.8	2.5	3.0
Washington Terrace)	Days above standard	0	0	0	0	0

Source: EPA 2007b NA = Data not available

Exhibit 3.9-5: Summary of O₃ Monitoring Data for **Davis and Weber Counties**

Station	Parameter	2005	2004	2003	2002	2001
Davis County						
Bountiful (65 West 300 South, Bountiful)	Peak 1-hour value (ppm) ^a Peak 8-hour value (ppm) ^b Days above standard	NA NA 0	NA NA 0	0.097 0.076 0	0.110 0.093 5	0.134 0.109 2
Bountiful #2 (171 West 1370 North, Bountiful)	Peak 1-hour value (ppm) Peak 8-hour value (ppm) Days above standard	0.129 0.108 8	0.095 0.077 0	0.101 0.083 0	NA NA 0	NA NA 0

^a 1-hour CO standard = 35 ppm $^{\rm b}$ 8-hour CO standard = 9 ppm

 $^{^{\}circ}$ 1-hour O_3 standard = 0.12 ppm

 $^{^{\}rm b}$ 8-hour ${\rm O_3}$ standard = 0.08 ppm

Exhibit 3.9-6: Summary of SO₂ Monitoring Data for Davis and Weber Counties

Station	Parameter	2005	2004	2003	2002	2001
Davis County						
Bountiful (65 West 300	Annual average (ppm) ^a	NA	NA	0.002	0.002	0.002
South, Bountiful)	Peak 24-hour value (ppm)b	NA	NA	0.008	0.010	0.012
	Peak 3-hour value (ppm) ^c	NA	NA	0.018	0.034	0.038
	Peak 1-hour value (ppm) ^d	NA	NA	0.026	0.055	0.041
	Days above standard	0	0	0	0	0
Bountiful #2 (171 West 1370 North, Bountiful)	Annual average (ppm) ^a	0.002	0.002	0.002	NA	NA
	Peak 24-hour value (ppm)b	0.012	0.009	0.005	NA	NA
	Peak 3-hour value (ppm) ^c	0.035	0.022	0.014	NA	NA
	Peak 1-hour value (ppm) ^d	0.045	0.031	0.026	NA	NA
	Days above standard	0	0	0	0	0

Source: EPA 2007b NA = Data not available

Exhibit 3.9-7: Summary of NO₂ Monitoring Data for Davis and Weber Counties

Station	Parameter	2005	2004	2003	2002	2001
Davis County						
Bountiful (65 West 300	Annual average (ppm)ª	NA	NA	0.017	0.019	0.019
South, Bountiful)	Peak 1-hour value (ppm)b	NA	NA	0.079	0.122	0.100
	Days above standard	0	0	0	0	0
Bountiful #2 (171 West	Annual average (ppm)	0.019	0.021	0.022	NA	NA
1370 North, Bountiful)	Peak 1-hour value (ppm)	0.081	0.079	0.072	NA	NA
	Days above standard	0	0	0	0	0
Weber County						
Ogden (228 32nd	Annual average	0.024	0.025	0.026	0.027	0.028
Street, Ögden)	Peak 1-hour value	0.090	0.096	0.144	0.158	0.078
	Days above standard	0	0	0	0	0

^a Annual SO₂ standard = 0.03 ppm

 $^{^{\}rm b}$ 24-hour ${\rm SO_2}$ standard = 0.14 ppm

 $^{^{\}rm c}$ No 3-hour ${\rm SO_2}$ standard

^d No 1-hour SO₂ standard

 $^{^{\}circ}$ Annual NO $_2$ standard = 0.053 ppm

^b No 1-hour NO₂ standard

Exhibit 3.9-8: Summary of PM_{10} Monitoring Data for **Davis and Weber Counties**

Station	Parameter	2005	2004	2003	2002	2001
Davis County						
Bountiful (65 West 300	Annual average (µg/m³)ª	NA	NA	18	NA	NA
South, Bountiful)	Peak 24-hour value (µg/m³)b	NA	NA	64	NA	NA
	Days above standard	0	0	0	0	0
Bountiful #2 (171 West	Annual average (µg/m³)	30	31	24	NA	NA
1370 North, Bountiful)	Peak 24-hour value (µg/m³)	77	92	42	NA	NA
	Days above standard	0	0	0	0	0
Weber County						
Ogden (228 32nd	Annual average (µg/m³)	23	28	29	35	32
Street, Ogden)	Peak 24-hour value (µg/m³)	122	136	229	344	171
	Days above standard	0	0	2	1	0

 $^{^{\}rm a}$ Annual PM $_{\rm 10}$ standard = 50 $\mu{\rm g/m^3}$

 $^{^{\}mathrm{b}}$ 24-hour PM $_{\mathrm{10}}$ standard = 150 $\mu\mathrm{g/m^{3}}$

Exhibit 3.9-9: Summary of $PM_{2.5}$ Monitoring Data for Davis and Weber Counties

Station	Parameter	2005	2004	2003	2002	2001
Davis County						
Bountiful (65 West 300	Annual average (µg/m³)°	NA	NA	7.5	11.0	10.0
South, Bountiful)	Peak 24-hour value (µg/m³)b	NA	NA	45.0	81.0	66.0
	Days above standard	0	0	0	0	0
Bountiful #2 (171 West	Annual average (µg/m³)	9.9	13.3	9.7	NA	NA
1370 North, Bountiful)	Peak 24-hour value (µg/m³)	48.0	74.0	47.0	NA	NA
	Days above standard	0	0	0	0	0
Weber County						
Ogden (228 32nd	Annual average (µg/m³)	10.5	13.9	10.0	14.5	11.6
Street, Ögden)	Peak 24-hour value (µg/m³)	42.0	74.0	38.0	108.0	67.0
	Days above standard	0	0	0	0	1
Washington Terrace	Annual average (µg/m³)	8.8	11.6	7.6	12.5	10.4
(4601 South 300 West,	Peak 24-hour value (µg/m³)	34.0	70.0	33.0	83.0	66
Washington Terrace)	Days above standard	0	0	0	0	0
Ogden #2 (425 West	Annual average (µg/m³)	9.0	11.5	8.0	12.2	9.2
2550 North, Ogden)	Peak 24-hour value (µg/m³)	38.0	74.0	31.0	98.0	52.0
	Days above standard	0	0	0	0	0

 $^{^{\}rm a}$ Annual PM_{2.5} standard = 15 μ g/m $^{\rm 3}$

 $^{^{\}rm b}$ 24-hour PM $_{\rm 2.5}$ standard = 35 $\mu {\rm g/m^3}$

3.10 **Noise**

This section describes the existing noise environment in the S.R. 108 noise impact analysis area. The impact analysis area for the noise analysis is defined as the land adjacent to the proposed alignments that could be affected by an increase in noise from construction and operation of the S.R. 108 proposed alternatives. To provide a general context for the noise environment, this section provides a regional overview. This section also describes the general characteristics of noise, provides a regulatory overview of the noise standards that apply to the proposed project, and presents the monitored noise levels that were recorded along S.R. 108.

3.10.1 **Characteristics of Noise**

Noise is defined as unwanted sound. The decibel (dB) is the accepted unit for measuring noise levels. Sound-level meters measure the actual pressure fluctuations caused by sound waves and record separate measurements for different sound frequency ranges.

Most sounds consist of a broad range of sound frequencies. Several frequency-weighting schemes have been used to develop composite decibel scales that approximate the way the human ear responds to noise levels. The A-weighted decibel scale (dBA) is most widely used for this purpose. Exhibit 3.10-1 below shows the noise levels associated with everyday noise sources.

A noise level change of 3 dBA is barely perceptible to humans, but a 5-dBA change is noticeable. A 10-dBA change in noise is generally perceived as a doubling of noise loudness, while a 20-dBA change is considered a dramatic change in noise levels.

What is noise?

Noise is defined as unwanted sound. This EIS uses the A-weighted decibel scale (dBA) for measuring noise levels.

Exhibit 3.10-1: Human Perceptions of Sound Levels

Examples of Sound Sources	dBA°	Human Perception
	0	Threshold of hearing
	10	Just audible
Broadcasting studio background	20	
Soft whisper at 15 feet	30	Very quiet
In living room, bedroom, or library	40	
	50	Quiet
Air conditioner at 20 feet; light auto traffic at 50 feet	60	
Freeway traffic at 50 feet	70	Intrusive; telephone use difficult
Passenger train at 100 feet; freight train at 50 feet; helicopter at 500 feet	80	Annoying
Heavy truck at 50 feet; pneumatic drill at 50 feet	90	Hearing damage after 8 hours
Shout at 0.5 foot; inside New York subway station	100	Very annoying
Riveting machine; jet takeoff at 2,000 feet	110	
Jet takeoff at 200 feet; auto horn at 3 feet; inside discotheque	120	Threshold of feeling and pain
	130	Painfully loud
Carrier deck jet operation	140	Limit of amplified speech
		<u> </u>

Source: CEQ 1970

3.10.2 Regulatory Basis for Noise Analysis

3.10.2.1 UDOT and FHWA

Equivalent Sound Level. Federal regulatory agencies often use the equivalent sound level (L_{eq}) to evaluate noise impacts. The L_{eq} is defined as a constant sound level containing the same sound energy as a more fluctuating sound. Equivalent sound levels are used to develop single-value descriptions of average noise exposure over stated periods of time. $L_{eq}(24)$, for example, is the equivalent sound level for a 24-hour period. Most often, 1-hour L_{eq} values are used to describe traffic noise levels.

^a Typical A-weighted sound levels taken with a sound-level meter and expressed as decibels on the A-weighted scale (dBA), which approximates the frequency response of the human ear.

Federal Highway Administration Noise Standards. The Federal

Noise Control Act of 1972 requires that all federal agencies administer programs in a manner that promotes an environment free from noise that could jeopardize public health or welfare. FHWA has adopted criteria for evaluating noise impacts associated with federally funded highway projects. If the noise impacts from a project are high enough, they could justify funding for noise mitigation (FHWA, 23 Code of Federal Regulations [CFR] 772).

FHWA noise-abatement criteria are based on peak-hour L_{eq} noise levels. The peak-hour outdoor L_{eq} criterion for permissible noise levels in residential, educational, and healthcare facilities is 67 dBA. The peak 1-hour outdoor L_{eq} criterion for commercial and industrial areas is 72 dBA. The FHWA noise-abatement criteria as implemented by UDOT are summarized in Exhibit 3.10-2.

Exhibit 3.10-2: UDOT Noise-Abatement Criteria

Activity Category	L _{eq} Noise Levels	Description of Activity Category
А	56 dBA (exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
В	66 dBA (exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals
С	71 dBA (exterior)	Developed lands, properties, or activities not included in above categories
D	_	Undeveloped lands
E	51 dBA (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

Source: UDOT 2008 (revised UDOT Noise Policy dated January 15, 2008)

Utah State Guidelines. UDOT's Noise-Abatement Policy (UDOT 08A2-1) establishes policies and procedures for conducting traffic noise studies, coordinating within UDOT, involving the public and local government agencies, and approving mitigation measures. The policy references FHWA 23 CFR 772 and Utah Administrative Code (UAC) 72-6-111 and 72-6-112.

Under UDOT Policy 08A2-1, the proposed S.R. 108 project is considered a Type I project, which is defined as construction of a highway at a new location or a physical alteration of an existing highway that substantially changes the alignment or increases the number of

through-traffic lanes. According to UDOT Policy 08A2-1, a traffic noise impact occurs when either of the following conditions occurs

at a sensitive land use (such as a residence, school, park, or hospital):

- 1. The expected noise level with the project is greater than or equal to 66 dBA, or
- 2. The expected noise level with the project exceeds the existing noise level by 10 dBA or more.

3.10.3 Existing Noise Levels

The noise impact analysis area consists of a mix of undeveloped land with residential, recreational, and commercial land uses interspersed along S.R. 108 (see Section 3.1, Land Use).

To determine existing noise levels, measurements were taken at 10 locations throughout the impact analysis area. These locations were chosen to represent existing residential developments, recreation areas, schools, and other areas where people frequently could be exposed to traffic noise. Exhibit 3.10-3 lists the noise level that was measured at each monitoring location. Exhibit 3.10-4 through Exhibit 3.10-6 below show the locations along S.R. 108 where noise was monitored. With the exception of monitoring location ML-7, all monitored noise levels were below the UDOT noise-abatement criterion of 66 dBA for residential and recreation locations.

Exhibit 3.10-3: Monitored Noise Levels

Monitoring Location (ML)	UDOT Category°	Location	Monitored L _{eq} (dBA)
ML-1	В	Syracuse Junior High School	53
	=	,	
ML-2	В	Residential area, 1150 South 2035 West	45
ML-3	В	Residential area, 1350 South 1960 East	60
ML-4	В	Residential area, 2100 West 632 North	44
ML-5	В	Residential area, 1520 North 1977 West	58
ML-6	В	Residential area, 2265 North 2100 West	48
ML-7	В	Residential area, 3500 West 5350 South	66
ML-8	В	Residential area, 3450 West 4950 South	58
ML-9	В	Karol's Mobile Estates	52
ML-10	В	Century Park Meadows	58

^a See Exhibit 3.10-2: UDOT Noise-Abatement Criteria above for a description of UDOT activity category B.

What does noise monitoring along S.R. 108 show?

Noise levels along S.R. 108 are typical of mixed urban and suburban environments that have a mix of residential and commercial uses with high levels of street traffic.



Exhibit 3.10-4: Noise Monitoring Locations, ML-1 to ML-4





Exhibit 3.10-5: Noise Monitoring Locations, ML-5 to ML-7

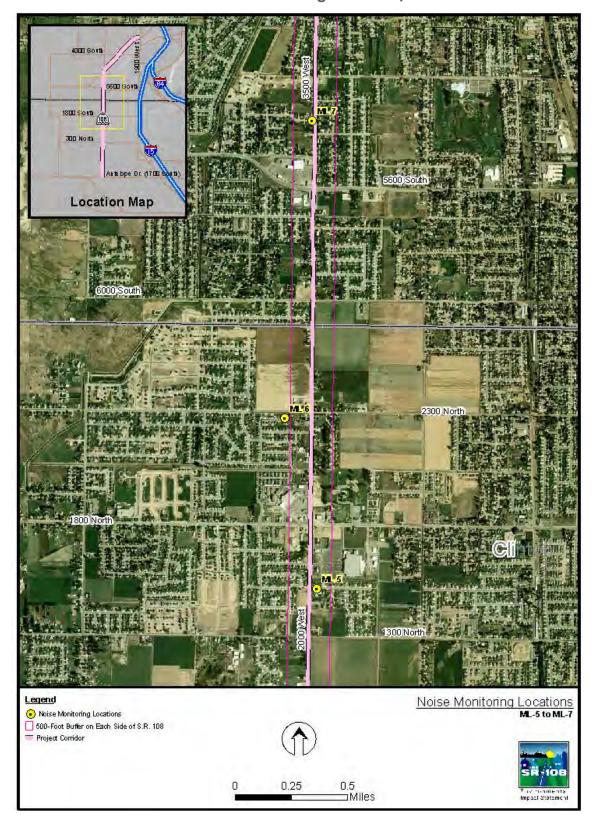
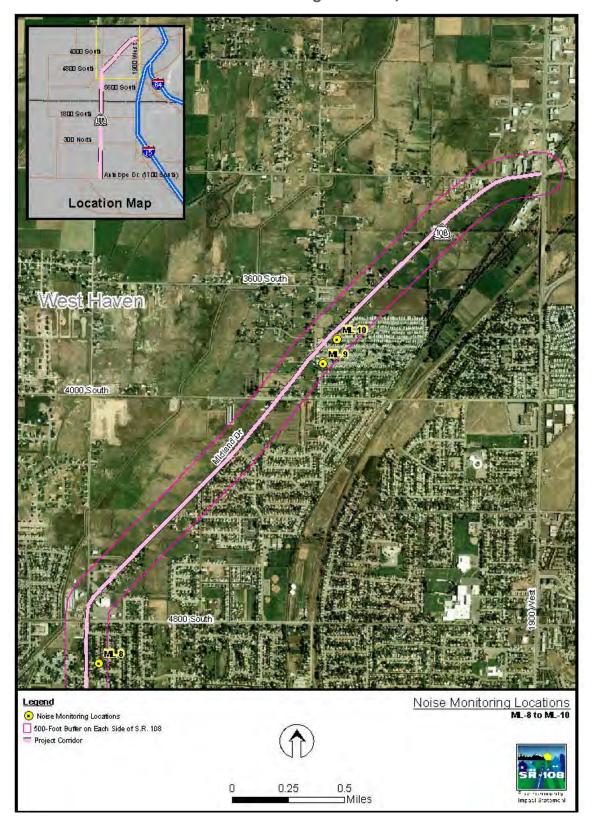




Exhibit 3.10-6: Noise Monitoring Locations, ML-8 to ML-10



3.11 Water Quality

This section describes the existing conditions of surface water and groundwater in the water quality impact analysis area. The water quality impact analysis area includes the water bodies that could be affected by construction and operation of S.R. 108. Most of these waters flow toward the Great Salt Lake, which is about 3 miles from S.R. 108.

3.11.1 Water Quality Regulations

Water quality in Utah is regulated by EPA's federal Clean Water Act and the regulations of the Utah Division of Water Quality and the Utah Division of Drinking Water (UAC Rule 317 and Rule 309) as summarized below.

3.11.1.1 Water Quality Standards

Under the federal Clean Water Act, every state must establish and maintain water quality standards designed to protect, restore, and preserve the quality of waters in the state. These standards consist of numeric standards, narrative standards, and antidegradation provisions.

Water bodies are considered to have various *beneficial uses* such as providing drinking water, supporting wildlife, and supporting recreation. Numeric standards for water quality are intended to protect these beneficial uses by limiting the amounts of certain pollutants in the water. Narrative standards are more general statements that prohibit unacceptable water quality conditions such as visible pollution. Antidegradation provisions are intended to maintain high-quality waters at levels above the applicable water quality standards.

The Utah Administrative Code (Rule 317) classifies surface water bodies in the state according to their beneficial uses, and most classifications have associated numeric water quality standards. The beneficial uses for water bodies in Utah are listed in Exhibit 3.11-1 below.

What are beneficial uses?

Lakes, rivers, and other water bodies have uses to humans and other life. These uses are called *beneficial uses*. The State of Utah defines 13 different beneficial uses for rivers, streams, lakes, and reservoirs in Utah (see Exhibit 3.11-1 below).

Exhibit 3.11-1: Designated Beneficial Uses for Rivers, Streams, Lakes, and Reservoirs in Utah

Class	Description
1	Protected for use as a raw water source for domestic water systems.
1C	Protected for domestic purposes with prior treatment by treatment processes as required by the Utah Division of Drinking Water.
2	Protected for recreational use and aesthetics.
2A	Protected for primary contact recreation such as swimming.
2B	Protected for secondary contact recreation such as boating, wading, or similar uses.
3	Protected for use by aquatic wildlife.
3A	Protected for cold-water species of game fish and other cold-water aquatic life, including the necessary aquatic organisms in their food chain.
3B	Protected for warm-water species of game fish and other warm-water aquatic life, including the necessary aquatic organisms in their food chain.
3C	Protected for nongame fish and other aquatic life, including the necessary aquatic organisms in their food chain.
3D	Protected for waterfowl, shore birds, and other water-oriented wildlife not included in classes 3A, 3B, or 3C, including the necessary aquatic organisms in their food chain.
3E	Severely habitat-limited waters. Narrative standards will be applied to protect these waters for aquatic wildlife.
4	Protected for agricultural uses including irrigating crops and stock watering.
5	The Great Salt Lake. Protected for primary and secondary contact recreation; waterfowl, shore birds, and other water-oriented wildlife including the necessary aquatic organisms in their food chain; and mineral extraction.

Source: Utah Administrative Code R317-2-13, Classification of Waters of the State, September 2006

Before granting a permit for a project, EPA, through the U.S. Army Corps of Engineers, requires the Utah Department of Environmental Quality (UDEQ) to certify that the project would not cause Utah's water quality standards to be exceeded. This certification process is in accordance with Clean Water Act Section 401.

3.11.1.2 Pollutants in Surface Water

EPA delegated authority for the National Pollutant Discharge Elimination System (NPDES) program in Utah to UDEQ. Under this program, certain activities such as industrial processes, wastewater treatment operations, municipal stormwater discharges, construction projects that disturb more than 1 acre of land, and construction dewatering projects require a Utah Pollutant Discharge Elimination System (UPDES) permit.

3.11.1.3 Pollutants in Groundwater and Aquifers

Classifications of Groundwater. Utah classifies groundwater according to the concentrations of total dissolved solids (TDS) and contaminants (Utah Division of Water Quality 2006). The four classifications of groundwater are:

- Class I TDS concentrations of less than 500 mg/L (milligrams per liter) and no contaminants that exceed the groundwater quality standards. (The groundwater quality standard is a lengthy list of contaminants and standards for contaminant concentrations.)
- Class II TDS concentrations between 500 mg/L and 3,000 mg/L. No contaminants that exceed the groundwater quality standards.
- Class III TDS concentrations between 3,000 mg/L and 10,000 mg/L, or one or more contaminants that exceed the groundwater quality standards.
- Class IV TDS concentrations above 10,000 mg/L. This is considered saline groundwater.

Classifications of Aquifers. The Utah Water Quality Board classifies aquifers according to their quality and use (such as ecologically important, irreplaceable, drinking water quality, and saline). The Utah Division of Water Quality publishes numeric standards for each class of aquifer. Any person can petition the Board to classify an aquifer. In addition, the Division requires groundwater permits for activities that discharge pollutants into groundwater.

3.11.1.4 Drinking Water Source Protection Plans and Zones

Owners of public water systems are responsible for protecting sources of drinking water and for submitting a Drinking Water Source Protection Plan to the Utah Division of Drinking Water. Drinking Water Source Protection Plans must identify drinking water source protection zones around each drinking water source (such as a lake, river, spring, or groundwater well), existing sources of contamination, and the types of new construction projects that are restricted within each zone.

What is the narrative standard for Utah waters?

The narrative standard applies to all waters in Utah. This standard states:

"It shall be unlawful, and a violation of these regulations, for any person to discharge or place any waste or other substance in such a way as will be or may become offensive such as unnatural deposits, floating debris, oil, scum or other nuisances such as color, odor or taste; or cause conditions which produce undesirable aquatic life or which produce objectionable tastes in edible aquatic organisms; or result in concentrations or combinations of substances which produce undesirable physiological responses in desirable resident fish, or other desirable aquatic life, or undesirable human health effects, as determined by bioassay or other tests performed in accordance with standard procedures."

The Utah Division of Drinking Water requires the Drinking Water Source Protection Plan to identify four distinct drinking water source protection zones for a groundwater wellhead:

- **Zone 1** is the area within a 100-foot radius from the wellhead.
- **Zone 2** is the area within a 250-day groundwater time of travel to the wellhead.
- **Zone 3** is the area within a 3-year groundwater time of travel to the wellhead.
- **Zone 4** is the area within a 15-year groundwater time of travel to the wellhead.

In general, certain types of development are not allowed within a designated drinking water source protection zone unless it can be shown that the withdrawal point is isolated from the contaminant source by a confining layer or that the specific development would not be a source of contamination. In most cases, roads are an allowable form of development.

3.11.2 **Surface Waters**

The S.R. 108 water quality impact analysis area is within the Weber River watershed, but no natural rivers or creeks cross the water quality impact analysis area. There are no high-quality waters in the impact analysis area, so these resources are not discussed in this section. There are, however, a few unnamed drainage canals that cross under S.R. 108.

In the southern part of the impact analysis area, these drainage canals discharge to the Hooper Canal and ultimately to the Great Salt Lake. Storm drains and ditches in the northern part of the impact analysis area discharge to Howard Slough, which is located about 1 mile west of S.R. 108, and the stormwater then discharges to the Great Salt Lake. For water quality analysis purposes, the impact analysis area includes Howard Slough, Hooper Canal, and the Great Salt Lake.

Howard Slough has beneficial use classifications of 2B, 3C, and 4 (protected for secondary contact recreation, non-game fish and other aquatic life, and agricultural uses). No designated beneficial uses are listed in UAC Rule 317 for Hooper Canal. Because UDEQ does not maintain water quality data for these waters, the existing water

What surface waters are present in the impact analysis area?

There are no natural rivers or creeks in the water quality impact analysis area. A few unnamed drainage canals cross under S.R. 108, but none of these are high-quality waters.

quality is assumed to be similar to the water quality in the lower reaches of the Weber River watershed.

3.11.2.1 Great Salt Lake

The Great Salt Lake is a remnant of Lake Bonneville, a freshwater lake that covered the majority of the Salt Lake, Davis, and Weber Counties 10,000 to 30,000 years ago and left visible shorelines, called benches, along the Wasatch Front range. At its lowest level, the lake covers an area of 610,000 acres. Although it is about 3 miles from S.R. 108, the Great Salt Lake is included in the water quality analysis because storm water runoff that originates in or passes through the impact analysis area ultimately discharges to the Great Salt Lake.

UDEQ classifies the Great Salt Lake as a Class 5 water, which means it is protected for primary and secondary contact recreation, aquatic wildlife, and mineral extraction. UDEQ has established a narrative standard that protects these beneficial uses, but no numeric standards are currently in effect. Water quality constituents in the lake are sodium, magnesium, potassium, calcium, chloride, and sulfate. The marketable resources from the lake are salt products, potassium sulfate for fertilizer, magnesium chloride brines used in the production of magnesium metals and chlorine gas, and brine shrimp and their eggs.

The Great Salt Lake is known for its high salinity. Salinity is a measure of the salt content in water. The salinity of the Great Salt Lake ranges from 9% to 28% (Utah Geological and Mineral Survey 1990). For comparison, the salinity of most ocean water is about 3%.

3.11.3 Groundwater

3.11.3.1 Groundwater Quality

East Shore Aquifer System

The East Shore aquifer system is located between the Wasatch Range and the Great Salt Lake. The aquifer system is bounded on the north by North Ogden and on the south by North Salt Lake and underlies the entire water quality impact analysis area.

Within the East Shore aquifer system, groundwater occurs in unconsolidated sand and gravel deposits both as a water table and under pressurized (artesian) conditions. Most groundwater is withdrawn from the deep, confined portion of the aguifer. Water enters the deep aquifers primarily along the east edge of the Weber River delta and all along the Wasatch Fault zone where the aquifers are unconfined. Near the impact analysis area, the deep, confined portion of the aquifer water moves up toward the surface (Utah Department of Natural Resources 1990). This upward gradient recharges the shallow groundwater in some locations.

Groundwater levels have generally declined throughout the East Shore area since the 1950s, though a few wells have shown a slight increase in water levels. Levels around Hill Air Force Base have experienced some of the largest declines in all of Utah. The State Engineer has closed the East Shore area to new groundwater appropriations except for 1-acre-foot applications and shallow wells less than 30 feet deep (Utah Division of Water Resources 2004).

The quality of groundwater in the East Shore area is directly related to the quality of its recharge water and the composition of the rocks and soil through which the water flows from the points of recharge to the points of discharge (Utah Department of Natural Resources 1990). Therefore, groundwater quality, especially in shallow water-bearing geologic deposits, can vary greatly by location and over time.

There are no protected or classified aquifers in the water quality impact analysis area, and no springs have been identified (Utah Division of Water Quality 2001).

3.11.3.2 Groundwater Rights

The Utah Division of Water Rights classifies groundwater wells according to their use: domestic (drinking water), irrigation, stock watering, municipal, or recreational. The municipal classification indicates that the well is owned by a city or county for a variety of uses, including drinking water or agriculture. The Division of Water Rights tracks groundwater rights according to an inventoried water right number. Each water right number represents one or more actual groundwater wells. The approximate locations of the well or cluster of wells corresponding to a water right number are shown in Exhibit 3.11-2 and Exhibit 3.11-3 below.

What is an aquifer?

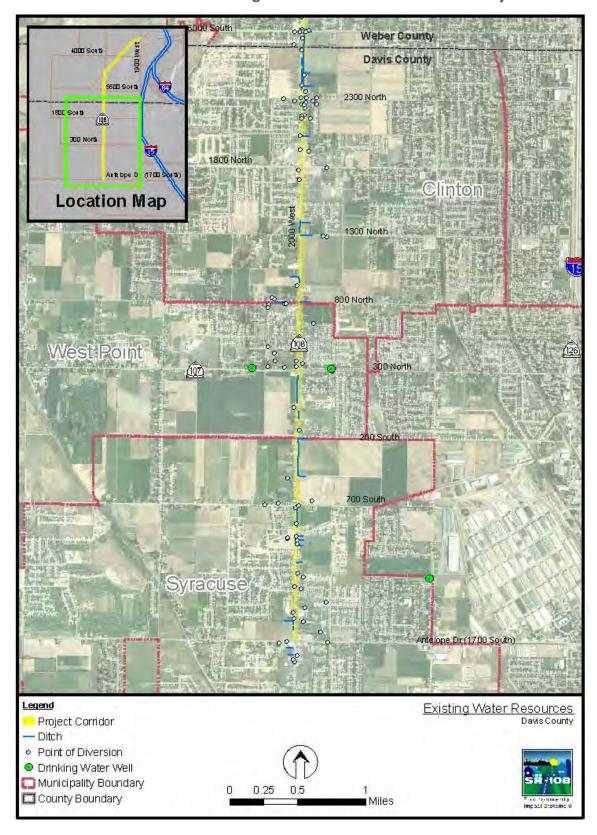
An aquifer is an underground geologic formation that easily stores and transmits water. Aquifers can be composed of either porous rock or unconsolidated deposits of sand and gravel. An aquifer is said to be confined if it is covered by an impermeable layer of rock or clay. Due to this confining layer, the groundwater in confined aquifers is usually under pressure. Drilling a well into a confined aquifer can produce an artesian well-one where the pressurized water rises to the surface without the aid of a pump.

What aquifers are present in the impact analysis area?

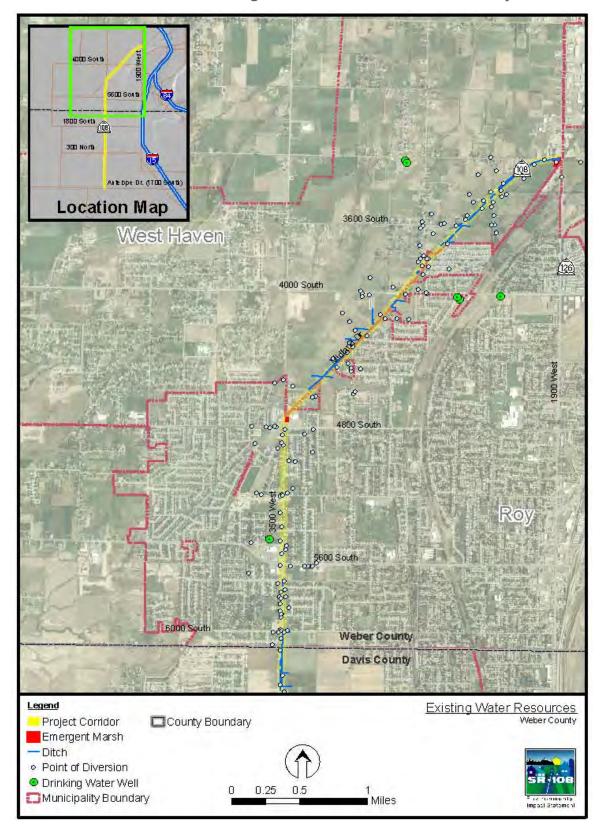
The East Shore aguifer system underlies the entire water quality impact analysis area. However, there are no protected or classified aquifers in the impact analysis area.



Exhibit 3.11-2: Existing Water Resources in Davis County







3.11.4 Drinking Water Source Protection Zones

There are nine drinking water wells with source protection zones in the water quality impact analysis area. Exhibit 3.11-4 provides an overview of the wells along S.R. 108. In general, certain types of development are not allowed within a designated drinking water protection area unless it can be shown that the well is isolated from the surface by a confining layer, or the development would not be a source of contamination.

Exhibit 3.11-4: Drinking Water Sources in the Water Quality Impact Analysis Area

Water System Owner	Sources
West Point Water System	2
Syracuse Water System	1
Hooper Water Improvement District	3
Roy	1
Taylor–West Weber Water Improvement District	2
Total	9

Source: Jensen 2006

3.12 **Ecosystem**

This section describes the existing bird and wildlife habitat, wildlife, special-status species, and wetlands in the ecosystem impact analysis area. For this evaluation, the ecosystem impact analysis area includes both the S.R. 108 project corridor and adjacent areas (such as the Great Salt Lake) that support wildlife that might use the project corridor. The S.R. 108 project corridor used in this analysis consists of the existing roadway and the surrounding area out to a distance of 200 feet on either side of the roadway.

The Utah Division of Wildlife Resources and the U.S. Fish and Wildlife Service (USFWS) were asked to be participating agencies on this project, and USFWS was also invited to be a cooperating agency. USFWS requested to be a participating agency and the Utah Division of Wildlife Resources declined to be a participating agency. Both agencies were contacted to determine whether there are any State of Utah sensitive species or federally listed wildlife or plant species in the ecosystem impact analysis area. USFWS and the Utah Division of Wildlife Resources provided a list of sensitive species for both Davis and Weber Counties. Some of these species could be present within the counties but not within the S.R. 108 ecosystem impact analysis area.

Field surveys were conducted between June and September 2006 and in November 2006 to document the existing conditions in the ecosystem impact analysis area and to identify habitat that could support sensitive species. Aerial photographs of the impact analysis area were reviewed, and then onsite field investigations were conducted.

3.12.1 Habitat for Fish, Wildlife, and **Migratory Birds**

In general, the ecosystem impact analysis area is highly developed and urbanized and consists of residential and commercial areas with a few remaining agricultural remnants, many of which are idle and planned for development. The dominant vegetation types are landscaped, ornamental plants; agricultural species; invasive weedy species on disturbed sites; native plants, pasture grasses, and invasive species on active or idle pastureland; and emergent plants in drainage ditches and stormwater collection ponds.

What are ecosystem resources?

In this EIS, ecosystem resources consist of bird and wildlife habitat, wildlife, special-status species, and wetlands.

What are emergent plants?

Emergent plants grow with their roots and lower stems in the water, but most of the plant is above the water's surface (cattails are an example).

There is no fish habitat in the impact analysis area. There is also no pristine wildlife habitat in the impact analysis area, only areas that have been converted to urban uses or agriculture. This disturbed and fragmented habitat provides very little benefit to most species except those that have adapted to an urban environment.

3.12.1.1 Wildlife Habitat

The S.R. 108 project corridor and areas within one-half mile of this area consist of pastureland, cropland, urbanized areas, and disturbed sites (see Exhibit 3.2-2: Existing Cropland above). About 60% of the land within one-half mile of S.R. 108 is non-agricultural land that primarily consists of residential properties with a small amount of commercial development. Of the agricultural land within one-half mile of S.R. 108, about 70% is classified in some way as cropland, including smaller areas of small vegetable plots, turf grass, and idle cropland. The other 30% of agricultural land is classified as pastureland (irrigated, semi-irrigated, dry, or fallow).

Although the pastureland and cropland might provide some small value to wildlife, all of the city community development offices along S.R. 108 have targeted the agricultural land within their incorporated city limits for future residential or commercial development. The only open areas not identified for future residential or commercial development are parcels in Weber County that are not currently within any city's incorporated area. Weber County has identified some of this unincorporated land as agricultural (A-1) and apparently prefers it to remain that way, but residential development is still possible in the future (see Section 3.2.3, Future Planning and Zoning for Existing Farmland).

Pastureland

Pastureland can be usable habitat for some wildlife species. However, the value of pastureland as usable habitat depends on the quality of the pastureland. A pasture that mostly consists of non-native pasture grasses and invasive weeds is of much lower value to wildlife than a pasture with a wide variety of native plants, shrubs, and small trees.

The pastureland along S.R. 108 varies from maintained, irrigated pasture to weedy, dry, abandoned parcels. The vegetation in these

What wildlife habitat is present along S.R. 108?

About 60% of the land along S.R. 108 is residential or commercial properties, with the remaining 40% being cropland or pastureland. Developed land provides little habitat for wildlife, and most of the cropland and pastureland in the area does not have the variety of native plants needed to provide high-quality habitat. There are also some small areas of riparian (riverbank) vegetation along irrigation ditches and stormwater drainages.

pastures includes native or introduced grasses (Agropyron cristatum, Poa bulbosa, and Bromus spp.), forbs (Cirsium spp., Kochia scoparia, Chenopodium berlandieri, Trifolium spp., Lepidium spp., and Sisymbrium altissimum), shrubs (Chrysothamnus spp., Rhus spp., and Ribes spp.), and small trees (Elaeagnus angustifolia, Populus spp., and Acer negundo). However, most of the pastureland along S.R. 108 lacks the shrubs and trees needed to provide highvalue habitat for wildlife.

Cropland

The cropland areas consist of irrigated crops such as alfalfa, grain, corn, and onions. This land type also includes small vegetable plots, turf grass, and idle croplands.

Urbanized Areas

The landscaping found in urbanized areas (residential and commercial) consists mainly of turf grasses, decorative shrubs, nonnative trees and flowers, and cultivated fruit and vegetable species.

Disturbed Sites

The disturbed sites along S.R. 108 are typical of those found in northern Utah. Along S.R. 108, disturbed sites are mostly abandoned lots and soon-to-be-developed areas that vary considerably in their species mix. These sites most often include cheatgrass (Bromus tectorum), halogeton (Halogeton glomeratus), Russian thistle (Salsola pestifer), kochia (Kochia scoparia), tumbling mustard (Sisymbrium altissimum), thistle (Cirsium or Carduus spp.), and annual sunflower (Helianthus annuus).

Drainages

There are a few small irrigation ditches and stormwater drainages along S.R. 108 that provide riparian (riverbank) habitat for wildlife. The most prevalent vegetation along these drainages is cattails (*Typha* spp.), sedges (*Carex* spp.), and rushes (*Juncus* spp.). Jurisdictional wetlands are discussed in Section 3.12.4, Waters of the U.S.

3.12.1.2 Migratory Bird Habitat

The Great Salt Lake ecosystem is 3 miles west of S.R. 108 and is a critical part of the North American migratory flyway for shorebirds, waterfowl, raptors, and songbirds. This ecosystem includes habitats such as open water, saltwater and freshwater marshes, and shoreline mudflats. None of these critical habitats are present along S.R. 108.

Migratory songbirds and game birds favor shrub-community habitat. Although this type of habitat can sometimes remain in urban areas along fences and drainages, there is little shrub-community habitat along S.R. 108 because most of the patches of pastureland are bordered by residential or commercial developments. Therefore, there is very little high-quality migratory bird habitat along S.R. 108. However, the types of habitat discussed in Section 3.12.1.1, Wildlife Habitat, could be used by migratory birds, even if they are not ideal habitat.

3.12.2 Wildlife

The wildlife habitats along S.R. 108 are primarily those associated with an urbanized environment. Several species that are adapted to open spaces around human environments are likely to be common along S.R. 108, including the starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), magpie (*Pica hudsonia*), mule deer (*Odocoileus hemionus*), and deer mouse (*Peromyscus maniculatus*). Other species such as migratory songbirds, raptors, and game animals typically require large, unbroken ranges of native habitat.

The ecosystem impact analysis area includes small areas of riparian vegetation in irrigation ditches and storm drainages that provide a narrow corridor of wildlife habitat. The species that use these areas include miscellaneous songbirds such as red-winged blackbird (*Agelaius phoeniceus*), several species of small non-game mammals such as raccoon (*Procyon lotor*) and striped skunk (*Mephitis mephitis*), and a variety of rodents such as meadow vole (*Microtus virginianus*) and mice (*Peromyscus* spp.). These species also use the disturbed upland habitats associated with urban corridors.

What kinds of wildlife are present along S.R. 108?

Most of the wildlife along S.R. 108 is species that are adapted to open spaces around human environments. In addition, some species of songbirds, small non-game mammals, and rodents use the riparian vegetation in irrigation ditches and storm drainages.

3.12.3 Special-Status Species

Special-status species include plant and animal species that are currently listed, or are proposed for listing, as threatened and endangered by USFWS. Special-status species also include sensitive species designated by the State of Utah. Species listed by USFWS are protected from activities that could affect individuals or their habitat. Exhibit 3.12-1 below shows the species listed by the above agencies that are either known to exist or that might exist in Davis and Weber Counties.

In compliance with the Endangered Species Act of 1973, as amended, USFWS was contacted to determine whether the S.R. 108 alternatives would affect any threatened, endangered, or specialstatus species. USFWS had previously requested to be a participating agency on the project due to its interest in protecting federally listed species and migratory birds. As Exhibit 3.12-1 shows, the only federally listed species that might exist in or near the impact analysis area is the bald eagle, which is discussed in more detail on page 3-107.

The Utah Division of Wildlife Resources was also contacted to determine whether the S.R. 108 alternatives would affect any State of Utah sensitive species. The Division declined to be a participating agency because it did not feel that there was a large amount of wildlife habitat along S.R. 108. As Exhibit 3.12-1 shows, there are no State of Utah sensitive species that have habitat or that are known to exist along S.R. 108.

What special-status species are present along S.R. 108?

There are no State of Utah sensitive species that have habitat or that are known to exist along S.R. 108. The only federally listed species that might exist in or near the impact analysis area is the bald eagle.

Exhibit 3.12-1: Status and Probability of Occurrence of Special-Status Species

			Status	
Common Name	Scientific Name	Federal	State	Probability of Occurrence
Plants				
Ute ladies'-tresses	Spiranthes diluvialis	Т	SPC	No habitat in project corridor ^a
Birds				
Bald eagle	Haliaeetus leucocephalus	Т	Т	Known to occur outside project corridor
Yellow-billed cuckoo	Coccyzus americanus occidentalis	С	T	No habitat in project corridor
American white pelican	Pelecanus erythrorhynchos	_	SPC	Known to occur outside project corridor
Bobolink	Dolichonyx oryzivorus	_	SPC	No habitat in project corridor
Burrowing owl	Athene cunicularia	_	SPC	No habitat in project corridor
Ferruginous hawk	Buteo regalis	_	SPC	No habitat in project corridor
Grasshopper sparrow	Ammodramus savannarum	_	SPC	No habitat in project corridor
Greater sage-grouse	Centrocercus urophasianus	_	SPC	No habitat in project corridor
Lewis' woodpecker	Melanerpes lewis	_	SPC	No habitat in project corridor
Long-billed curlew	Numenius americanus	_	SPC	Known to occur outside project corridor
Northern goshawk	Accipiter gentilis	_	CS	Known to occur outside project corridor ^b
Sharp-tailed grouse	Typanuchus phasianellus	_	SPC	No habitat in project corridor
Short-eared owl	Asio flammeus	_	SPC	No habitat in project corridor
Reptiles/Amphibians/Fish				
June sucker	Chasmistes liorus	Е	_	No habitat in project corridor
Bluehead sucker	Catostomus discobolus	_	CS	No habitat in project corridor
Bonneville cutthroat trout	Oncorhynchus clarkii utah	_	CS	No habitat in project corridor
Columbia spotted frog	Rana luteiventris	_	CS	No habitat in project corridor
Least chub	lotichthys phlegethontis	_	CS	No habitat in project corridor
Smooth greensnake	Opheodrys vernalis	_	SPC	Known to occur outside project corridor
Western toad	Bufo boreas	_	SPC	No habitat in project corridor
Invertebrates				
Ogden rocky mountainsnail	Oreohelix peripherica wasatchensis	С	_	No habitat in project corridor
Deseret mountainsnail	Oreohelix peripherica	_	SPC	No habitat in project corridor
Lyrate mountainsnail	Oreohelix haydeni	_	SPC	No habitat in project corridor
Western pearlshell	Margaritifera falcata	_	SPC	No habitat in project corridor
Mammals				
Canada lynx	Lynx canadensis	Т	_	No habitat in project corridor
Gray wolf	Canis lupus	E	_	No habitat in project corridor
Kit fox	Vulpes macrotis	_	SPC	No habitat in project corridor
Townsend's big-eared bat	Corynorhinus townsendii	_	SPC	No habitat in project corridor

 $^{^{\}circ}$ Known to occur within Weber and/or Davis Counties, but not known to occur in the project corridor

Federal status: State of Utah status:

T = Federal threatened T = State threatened

 $\mathsf{E} = \mathsf{Federal} \ \mathsf{endangered} \qquad \qquad \mathsf{SPC} = \mathsf{State} \ \mathsf{species} \ \mathsf{of} \ \mathsf{special} \ \mathsf{concern}$

 $^{^{\}mathrm{b}}$ Migrant through the project corridor

3.12.3.1 Federally Listed Species

The only federally listed species that is known to exist near the ecosystem impact analysis area is the bald eagle (Haliaeetus leucocephalus). No other federally listed species that might exist in Weber or Davis Counties have habitat along S.R. 108.

Bald Eagle. The bald eagle is primarily a migrant through Utah, although two nesting pairs are known to exist in the state. There are migratory roosts in small sites along the mountains of the Wasatch Front where groups of bald eagles rest during migration and feed during stopovers to the Great Salt Lake ecosystem. Bald eagles usually choose non-migratory roosting sites in dense stands of deciduous or preferably coniferous trees that are a convenient distance from feeding areas (up to 18 miles).

There are no known migratory roosts for bald eagles along S.R. 108. Cottonwood snags (upright dead trees) along S.R. 108 could be used by bald eagles as a temporary perch, but there is no roosting, nesting, or foraging habitat for this species along S.R. 108.

3.12.3.2 State of Utah Sensitive Species

No State of Utah sensitive species have habitat or are known to exist along S.R. 108.

Waters of the U.S. 3.12.4

This section describes how wetlands and other potential waters of the U.S. along S.R. 108 were identified and evaluated. Waters of the U.S. include streams, drainages, and wetlands. The U.S. Army Corps of Engineers (USACE) determines whether areas identified as wetlands or other waters are regulated as waters of the U.S.

3.12.4.1 Wetlands Inventories

Wetlands inventories were performed between July and September 2006 and in April 2008. Existing data including aerial photographs and soil information from NRCS were used to aid the field investigations.

Wetlands were identified according to routine delineation methods described in the Corps of Engineers Wetlands Delineation Manual (USACE 1987). The manual uses a three-parameter approach

What are waters of the U.S.?

Under the Clean Water Act, waters of the U.S. are defined as waters that are navigable waters, those that are interstate waters, and/or those used for interstate commerce, their tributaries, and their associated wetlands. Waters of the U.S. are under the jurisdiction of USACE, so they are sometimes referred to as jurisdictional waters.

USACE has jurisdiction over most wetlands, but some wetlands are not considered jurisdictional. A wetland that is not navigable and is not used for interstate commerce or otherwise does not fit the definition of a water of the U.S. would not qualify as a jurisdictional wetland. This type of wetland is called an isolated wetland.

(hydrophilic vegetation, hydric soils, and wetland hydrology) to determine the presence of jurisdictional wetlands (that is, wetlands that are waters of the U.S.). Positive indicators for all three parameters are typically required for an area to qualify as a jurisdictional wetland. The boundaries of identified wetland areas were mapped using a global positioning system (GPS) unit. Additionally, other potentially jurisdictional waters such as ditches and canals were identified and assessed.

Two potentially jurisdictional emergent marsh wetlands were identified along S.R. 108 (see Exhibit 3.12-2 below). The first wetland is northeast of the Midland Drive/4800 South intersection. This wetland area appears to be a human-made detention basin and is surrounded by turf grass. It is an isolated 0.05-acre basin that contains wet soils and is dominated by emergent wetland vegetation. The second wetland is in the southwest corner of the S.R. 108 and 1900 West intersection. This wetland is about 0.36 acre of emergent marsh.

Forty-one human-made water conveyances were identified adjacent to S.R. 108. These conveyances were found throughout the impact analysis area and include many shallow ditches and a few larger, deeper ditches, cement-lined channels, and canals. Most of these conveyances run perpendicular to S.R. 108 and flow from east to west.

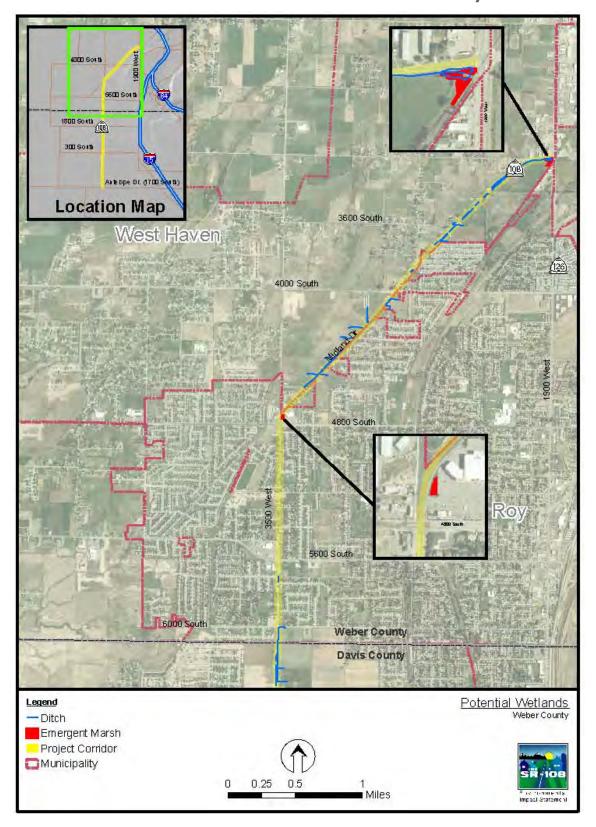
The main function of ditches is to convey irrigation water. A few channels also provide roadside drainage. Due to increasing development, several of these ditches are no longer used for irrigation. Most ditches are dominated by upland vegetation, while some ditches and roadside drainages contain riparian vegetation.

3.12.4.2 Jurisdictional Status

The jurisdictional wetland determination for the S.R. 108 project is being reviewed by USACE. The results of the final USACE jurisdictional determination will be used in obtaining any required permits for the project. For analysis purposes, the two wetlands identified in Section 3.12.4.1, Wetlands Inventories, have been considered jurisdictional wetlands.



Exhibit 3.12-2. Potential Wetlands - Weber County



3.13 Floodplains

There are no designated floodplains in the S.R. 108 study area.

3.14 Historic, Archaeological, and Paleontological Resources

This chapter describes the known historic, archaeological, and paleontological resources in the impact analysis area. The impact analysis area for the cultural resources analysis is the area likely to be directly or indirectly affected by the proposed alternatives.

Historic and archaeological resources are defined as those physical manifestations or remains of past human activity that are at least 50 years old. For the purpose of this EIS, and to account for the amount of time that would likely elapse between the identification of cultural resources as part of this EIS and the implementation of any project decision, the age for resources to be considered historic or archaeological was decreased to 45 years.

In this chapter, the term *historic resources* means architectural properties such as buildings. The term *archaeological resources* means sites, features, and structures that are at least 45 years old and are composed primarily of non-architectural elements. Such archaeological resources include everything from prehistoric campsites to historic railroads and canals. *Paleontological resources*, often referred to as fossils, are defined as the remains, traces, or imprints of ancient organisms preserved in or on the earth's crust that provide information about the history of life on earth.

3.14.1 Regulatory Basis for Cultural Resource Analysis

The cultural, historic, and paleontological resources inventory was completed to comply with the federal and state guidelines in Exhibit 3.14-1 below.

What are historic resources, archaeological resources, and paleontological resources?

Historic resources are architectural properties such as buildings.

Archaeological resources are sites, features, and structures composed primarily of non-architectural elements.

Paleontological resources are fossil resources.

Exhibit 3.14-1. Antiquities Laws and Regulations Applicable to the S.R. 108 Project

Title	Implementing Regulation	Year Enacted and Amended
Mining Law Act	None	1872; amended 1962
Antiquities Act	43 CFR 3	1906
Historic Sites Act	None	1935
Reservoir Salvage Act amended as the Archaeological and Historic Preservation Act, Archaeological Data Preservation Act of 1974 or Moss-Bennett Act	None	1960; amended 1974
National Historic Preservation Act (NHPA)	36 CFR 65 36 CFR 800 36 CFR 801 36 CFR 63	1966; amended 1980, 1992
Department of Transportation Act, Section 4(f)	None	1966; amended 1983 (relevant for easements through Bureau of Land Management–administered public land)
Executive Order 11593: Protection and Enhancement of the Cultural Environment	None	1971; codified as part of the 1980 amendments to the National Historic Preservation Act
American Indian Religious Freedom Act (AIRFA)	None	1978
Archaeological Resources Protection Act (ARPA)	43 CFR 7	1979; amended 1988
Native American Graves Protection and Repatriation Act (NAGPRA)	43 CFR 10	1990
Archeological and Historic Preservation Act (AHPA) of 1974 (16 U.S.C. 469 to 469c-2)	None	1974
Utah Antiquities Protection Act (UAC 9-8-101; UAC 63-73-19)	None	1992
Executive Order 13007: Indian Sacred Sites	None	1996
Executive Order 13175: Consultation and Coordination with Indian Tribal Governments	None	2000
Executive Order 13287: Preserve America	None	2003
UDOT/Utah Geological Survey Memorandum of Understanding (UAC 63-73-19 compliance)	None	1999

Resource Identification 3.14.2

The identification of historic, archaeological, and paleontological resources that could be affected by any of the alternatives under consideration was carried out using several methods. These methods consisted of literature reviews, field inspections, and consultation with agency experts, city and county personnel, Native American tribes, and members of the general public with specific information about cultural and paleontological resources in the impact analysis area for cultural resources. These methods are described in greater

detail in the archaeological and architectural resource surveys technical report (SWCA 2006).

3.14.2.1 Literature Reviews

Literature reviews included examining the project, site, and historic architectural records of the Utah State Historic Preservation Office (SHPO). Copies of records for historic and archaeological sites known to be present within or directly adjacent to all proposed alternatives were obtained. The National Register of Historic Places (NRHP) and lists of state and local landmarks were consulted for information regarding resources that might be present within the boundaries of each alternative. Additionally, published literature regarding the prehistoric and historic uses and the known geological composition of the area was reviewed to determine whether paleontological resources would be affected by the proposed alternatives.

3.14.2.2 Consultation

As part of the effort to identify historic, archaeological, and paleontological resources in the impact analysis area, Section 106 consultation was carried out between UDOT, FHWA, and several agencies. Among those agencies consulted are the Utah SHPO (both the Preservation and Antiquities Departments) and the Utah Geological Survey (UGS).

In addition to the agencies, consultation was undertaken with several other entities with direct interest in historic or archaeological resources that could be affected by the proposed alternatives. These entities included certified local governments (CLG) and historical societies and organizations. The Roy Historical Museum and the Syracuse CLG were contacted as part of this effort. No similar entities exist for Clinton, West Point, or West Haven, the three other communities along S.R. 108. None of the parties contacted during this consultation identified any properties of particular importance to the communities in question.

Several Native American tribes with patrimonial claims over the general project area were also consulted as part of efforts to identify cultural resources within the areas that could be affected by any of the proposed alternatives. These tribes were the Northwestern Band

What is the National Register of Historic Places?

The National Register of Historic Places, or NRHP, is a listing of archaeological sites, buildings, and structures throughout the United States that have undergone thorough documentation and rigorous evaluation and have been determined to be important in local, national, or international prehistory or history.

of Shoshone Nation, the Shoshone-Bannock Tribes, and the Uintah and Ouray Ute Indian Tribe.

3.14.2.3 Field Inspections

Two types of field inspections were conducted in the summer of 2006 to identify historic, archaeological, and paleontological resources that could be affected by the proposed alternatives. The first type of inspection focused on identifying historic architectural properties (buildings), and the other type focused on identifying archaeological and paleontological resources that are visible on the ground surface. The technical report produced for the cultural resource surveys of the S.R. 108 impact analysis area contains greater detail about the procedures used to identify, document, and evaluate historic architectural properties and archaeological and paleontological resources (SWCA 2006).

3.14.3 **Historic Architectural Properties**

As part of the environmental analysis for the S.R. 108 project, an inventory of architectural resources along S.R. 108 was conducted. Each property was evaluated against the criteria shown in Exhibit 3.14-2 to determine whether it was eligible for the NRHP.

Exhibit 3.14-2: Criteria for Evaluating the Eligibility of **Cultural Resources for the NRHP**

NRHP Criterion	Characteristics of the Cultural Resource
А	Associated with events that have made a significant contribution to the broad patterns of our history
В	Associated with the lives of persons significant in our past
С	Embodies distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction
D	Yields, or may be likely to yield, information important in prehistory or history

Source: 36 CFR 60

When conducting this inventory, the Utah SHPO's Standard Operating Procedures for Utah Reconnaissance-Level Surveys was used to assess the integrity of architectural properties. These procedures require surveyors to evaluate the degree of integrity of

each architectural property when assessing whether the property is eligible for the NRHP. The degrees of integrity used by the Utah SHPO are listed in Exhibit 3.14-3.

Exhibit 3.14-3: Utah SHPO Degrees of Integrity for Architectural Properties

Degree of Integrity	Characteristics of the Architectural Property
А	Eligible/Significant: Built during the historic period and retains integrity; excellent example of a style or type; unaltered or only minor alterations or additions; individually eligible for the NRHP under Criterion C; also, buildings of known historical significance.
В	Eligible: Built during the historic period and retains integrity; good example of a style or type, but not as well-preserved or well-executed as "A" buildings; more substantial alterations or additions than "A" buildings, though overall integrity is retained; eligible for the NRHP as part of a potential historic district or primarily for historical rather than architectural reasons (which cannot be determined at this point).
С	Ineligible: Built during the historic period but has had major alterations or additions; no longer retains integrity.
D	Ineligible: Not built during the historic period; built during the modern era.

Source: SWCA 2006

Historic buildings are generally considered to be those 50 years old or older. As agreed by UDOT, FHWA, and the Utah SHPO, and in consideration of the expected duration of this project, buildings that were built in 1961 or earlier were considered potentially historic. A total of 109 architectural properties that were built within the historic period (that is, built in 1961 or earlier) within the S.R. 108 project's area of potential effect were identified.

A total of 109 historic architectural properties were identified within the impact analysis area (see Exhibit 3.14-4 below). These properties, almost all of which are residential, include properties from the late 1800s to the middle 20th century. Of the 109 historic architectural properties, 61 are considered to be eligible for the NRHP and 48 are considered to be ineligible. UDOT's and FHWA's NRHP eligibility determinations for these properties were made in consultation with the Utah SHPO.

What is the historic period?

The *historic period* is the period during which historic buildings were built. Historic buildings are generally considered to be those 50 years old or older. In consideration of the expected duration of the S.R. 108 project, buildings that were built in 1961 or earlier were considered potentially historic.

Exhibit 3.14-4: Historic Architectural Properties along S.R. 108

Address ^a	Construction Date (Estimated)	National Register Eligibility
1663 South 2000 West, Syracuse	1926	Eligible under Criterion A
1609 South 2000 West, Syracuse	1929	Eligible under Criterion C
?1451 South 2000 West, Syracuse	1903	Eligible under Criterion C
1449 South 2000 West, Syracuse	1920	Not eligible
1433 South 2000 West, Syracuse	1925	Not eligible
1419 South 2000 West, Syracuse	1940	Eligible under Criterion C
1401 South 2000 West, Syracuse	1930	Eligible under Criterion C
1373 South 2000 West, Syracuse	1955	Eligible under Criterion C
1317 South 2000 West, Syracuse	1923	Eligible under Criterion C
1275 South 2000 West, Syracuse	1925	Not eligible
1217 South 2000 West, Syracuse	1920	Eligible under Criterion C
1189 South 2000 West, Syracuse	1958	Eligible under Criterion C
1147 South 2000 West, Syracuse	1959	Eligible under Criterion C
1133 South 2000 West, Syracuse	1930	Eligible under Criterion C
1021 South 2000 West, Syracuse	1953	Not eligible
963 South 2000 West, Syracuse	1920	Eligible under Criterion C
850 South 2000 West, Syracuse	1924	Eligible under Criterion C
723 South 2000 West, Syracuse	1910	Eligible under Criterion C
478 South 2000 West, West Point	1950	Not eligible
460 South 2000 West, West Point	1955	Not eligible
446 South 2000 West, West Point	1950	Not eligible
422 South 2000 West, West Point	1950	Not eligible
193 South 2000 West, West Point	1955	Not eligible
169 South 2000 West, West Point	1950	Not eligible
150 South 2000 West, West Point	1955	Eligible under Criterion C
145 South 2000 West, West Point	1958	Eligible under Criterion C
58 South 2000 West, West Point	1935	Eligible under Criterion C
39 South 2000 West, West Point	1955	Eligible under Criterion C
25 South 2000 West, West Point	1955	Not eligible
?20 North 2000 West, West Point	1940	Eligible under Criterion C
(agricultural outbuilding complex only)		
310 North 2000 West, West Point	1955	Eligible under Criterion C
340 North 2000 West, West Point	1900	Not eligible
535 North 2000 West, West Point	1900	Not eligible
647 North 2000 West, West Point	1950	Eligible under Criterion C
667 North 2000 West, West Point	1950	Eligible under Criterion C

Address°	Construction Date (Estimated)	National Register Eligibility
714 North 2000 West, West Point	1910	Not eligible
755 North 2000 West, West Point	1945	Not eligible
783 North 2000 West, West Point	1900	Not eligible
796 North 2000 West, West Point	1945	Eligible under Criterion C
817 North 2000 West, Clinton	1950	Eligible under Criterion C
868 North 2000 West, Clinton	1950	Eligible under Criterion C
881 North 2000 West, Clinton	1955	Eligible under Criterion C
914 North 2000 West, Clinton	1955	Not eligible
1071 North 000 West, Clinton	1905	Eligible under Criterion C
1141 North 2000 West, Clinton	1955	Eligible under Criterion C
1193 North 2000 West, Clinton	1945	Not eligible
1197 North 2000 West, Clinton	1950	Eligible under Criterion C
1221 North 2000 West, Clinton	1925	Not eligible
1253 North 2000 West, Clinton	1955	Eligible under Criterion C
1277 North 2000 West, Clinton	1960	Not eligible
1289 North 2000 West, Clinton	1945	Not eligible
1318 North 2000 West, Clinton	1925	Eligible under Criterion C
1607 North 2000 West, Clinton	1925	Not eligible
1693 North 2000 West, Clinton	1945	Eligible under Criterion C
1969 North 2000 West, Clinton	1960	Eligible under Criterion C
1993 North 2000 West, Clinton	1955	Eligible under Criterion C
2019 North 2000 West, Clinton	1935	Not eligible
2047 North 2000 West, Clinton	1945	Not eligible
2056 North 2000 West, Clinton	1950	Not eligible
2084 North 2000 West, Clinton	1955	Not eligible
2118 North 2000 West, Clinton (garage only; out-of-period geodesic dome residence now on property; foundation evidence of former house)	1950	Not eligible
2133 North 2000 West, Clinton	1920	Eligible under Criterion C
2162 North 2000 West, Clinton	1955	Eligible under Criterion C
2184 North 2000 West, Clinton	1955	Eligible under Criterion C
2212 North 2000 West, Clinton	1960	Eligible under Criterion C
2273 North 2000 West, Clinton	1910	Not eligible
2282 North 2000 West, Clinton	1937	Eligible under Criterion C
1956 West 2300 North, Clinton	1950	Not eligible
1988 West 2300 North, Clinton	1935	Eligible under Criterion C
2342 North 2000 West, Clinton	1930	Eligible under Criterion C
2404 North 2000 West, Clinton	1955	Eligible under Criterion C
2422 North 2000 West, Clinton	1960	Eligible under Criterion C

Address ^a	Construction Date (Estimated)	National Register Eligibility
2466 North 2000 West, Clinton	1915	Not eligible
2541 North 2000 West, Clinton	1945	Eligible under Criterion C
2637 North 2000 West, Clinton	1920	Not eligible
2647 North 2000 West, Clinton	1925	Not eligible
3446 West 6000 South, Roy	1955	Not eligible
5986 South 2000 West, Roy	1945	Eligible under Criterion C
5975 South 3500 West, Roy	1955	Not eligible
5939 South 3500 West, Roy	1955	Eligible under Criterion C
5891 South 3500 West, Roy	1940	Not eligible
5867 South 3500 West, Roy	1960	Eligible under Criterion C
5859 South 3500 West, Roy	1955	Not eligible
5854 South 3500 West, Roy	1925	Not eligible
5844 South 3500 West, Roy	1945	Eligible under Criterion C
5839 South 3500 West, Roy	1955	Eligible under Criterion C
5823 South 3500 West, Roy	1955	Eligible under Criterion C
5809 South 3500 West, Roy	1950	Not eligible
5720 South 3500 West, Roy	1955	Eligible under Criterion C
5491 South 3500 West, Roy	1925	Not eligible
5373 South 3500 West, Roy	1925	Not eligible
5307 South 3500 West, Roy	1935	Not eligible
5190 South 3500 West, Roy	1935	Not eligible
4935 South 3500 West, Roy	1900	Not eligible
4905 South 3500 West, Roy	1935	Not eligible
4596 Midland Drive, West Haven	1920	Not eligible
4180 Midland Drive, West Haven	1925	Eligible under Criterion C
4148 Midland Drive, West Haven	1925	Eligible under Criterion C
3997 Midland Drive, West Haven	1939	Not eligible
3982 Midland Drive, West Haven	1960	Eligible under Criterion C
3966 Midland Drive, West Haven	1955	Not eligible
3964 Midland Drive, West Haven	1960	Eligible under Criterion C
3801 Midland Drive, West Haven	1955	Eligible under Criterion C
3713 Midland Drive, West Haven	1930	Eligible under Criterion C
(outbuildings only)	1050	
3594 Midland Drive, West Haven	1950	Eligible under Criterion C
3575 Midland Drive, West Haven (outbuilding only)	1935	Eligible under Criterion C
3478 Midland Drive, West Haven	1960	Eligible under Criterion C
3315 Midland Drive, West Haven	1945	Not eligible
2008 West 3300 South, West Haven	1920	Eligible under Criterion C

See the archaeological and architectural resource surveys technical report (SWCA 2006) for a description of each property.

 $^{^{\}mbox{\tiny a}}$ A "?" in front of an address indicates an approximation.

3.14.4 Archaeological Sites

A total of four archaeological sites and segments of linear historic sites were identified within the impact analysis area along S.R. 108 (see Exhibit 3.14-5). These sites consist of the archaeological remains of a former residential complex, two historic ditch systems, and one historic railroad corridor. Of these sites, only one, the Denver & Rio Grande Western Railroad corridor, was determined to be eligible for the NRHP. The remaining three were determined to be ineligible. UDOT's and FHWA's determinations of eligibility were made in consultation with the Utah SHPO.

Exhibit 3.14-5: Archaeological Resources along S.R. 108

Site Number	Site Name (if applicable)	Site Type	National Register Eligibility
42Dv118 42Wb345	NA	Historic residential complex	Not eligible
42Wb345 42Wb346	NA NA	Historic ditch	Not eligible Not eligible
42Wb352	Denver & Rio Grande Western Railroad	Historic railroad	Eligible under Criterion A

3.14.4.1 Traditional Cultural Properties

No traditional cultural properties were identified within the impact analysis area through either field inspections or consultation with Native American tribes or other groups.

3.14.4.2 Paleontological Resources

No known paleontological resources are present within the impact analysis area. Consultation with UGS confirmed that no fossil localities have been previously documented in or near the S.R. 108 project corridor and that the overall potential for such resources is low because of the area's geology. However, exposures of Lake Bonneville deposits could be present in the area, and these deposits have been known to yield significant vertebrate fossils elsewhere along the Wasatch Front.

3.15 **Hazardous Waste Sites**

This section discusses the known and potential hazardous waste sites in the hazardous waste impact analysis area. In addition, this section discusses the process used to evaluate the sites that have the greatest potential to affect or be affected by construction. The hazardous waste impact analysis area is the area within one-half mile on each side of the existing S.R. 108 centerline.

3.15.1 **Potentially Hazardous Sites**

Environmental Data Resources, Inc. (EDR) conducted a survey of 40 environmental databases for sites with known contamination and sites that are regulated according to state or federal laws. This search identified potential hazardous waste sites in the impact analysis area.

Sites identified through the EDR database search were supplemented with a review of the Utah Division of Environmental Response and Remediation (DERR) interactive map viewer on August 17, 2006. DERR also maintains information on several of the types of sites listed in Exhibit 3.15-1 below. Exhibit 3.15-1 shows the number of potentially hazardous waste sites in the impact analysis area that were identified by the database search and the review of the interactive map. A site can be listed in multiple databases.

Exhibit 3.15-1: Number of Potentially Hazardous Sites in the Hazardous Waste Impact Analysis Area

Database ^a	Sites ^b
Facility Index System (FINDS)	4
Leaking Underground Storage Tanks (LUST)	4
Underground Storage Tanks (UST)	7
Aboveground Storage Tanks (AST)	3

Source: EDR 2006

- Comprehensive Environmental Response, Compensation, and Liability Information System – No Further Remedial Action Planned (CERCLIS-NFRAP)
- Resource Conservation and Recovery Information System Large-Quantity Generators (RCRIS-LQG)
- SPILLS
- Voluntary Cleanup Program (VCP)
- DRYCLEANERS
- National Pollution Discharge Elimination System (NPDES)

3.15.2 Site Screening

Hazardous waste—related incidents and facilities were screened to identify sites that are more likely to contain contaminated soil or groundwater and those located closer to the proposed project. The screening process identified the sites that have a reasonable chance of affecting or being affected by the proposed project. Site screening focuses on the types of sites that were identified in the EDR database search and found during the review of the DERR interactive map. The screening process entails:

- Identifying the type of site or event and its current status
- Comparing the site's location to the proposed project

3.15.2.1 Identify the Type of Site or Event and Its Current Status

The first step in evaluating sites of concern was to categorize the types of sites identified in the impact analysis area by the relative likelihood of finding contamination. Sites were categorized as having a high, moderate, or low probability of environmental degradation.

^a The following databases were searched, but no sites were found:

^b A site can be listed in multiple databases.

High Probability of Environmental Degradation. The following sites in the impact analysis area have a relatively high probability of environmental degradation:

Open LUST sites

Open LUST sites have had known releases of hazardous chemicals. Open LUST sites are evaluated and monitored by DERR. The amount of hazardous chemical release and the potential threat to human health and the environment dictate the degree of cleanup required.

Moderate Probability of Environmental Degradation. The following sites in the impact analysis area have a moderate probability of environmental degradation:

- Closed LUST sites
- Active UST sites

Closed LUST sites can have residual contamination, or contamination might have been left in place if it did not pose a threat to human health or the environment. Active UST sites are also regulated by DERR but typically have not been thoroughly investigated for chemical releases.

Low Probability of Environmental Degradation. The following sites in the impact analysis area have a low probability of environmental degradation:

- Removed and closed USTs
- **AST** sites
- FINDS sites

Removed or closed USTs typically indicate a site that has been remediated or that did not require remediation at the time of UST removal or in-place closure. Due to increased visibility, evidence of a leaking AST is more easily detected compared to LUST sites. A large-quantity release at a FINDS site would show up in a separate database, most likely the Resource Conservation and Recovery Information System (RCRIS), Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), or other databases with more information.

3.15.2.2 Compare the Site's Location to the Proposed Project

The second step in evaluating sites of concern was to evaluate each site's location relative to the S.R. 108 alternatives. The inferred direction of groundwater flow (west) was also a consideration.

3.15.3 Sites of Greatest Concern

In general, the sites of greatest concern are sites with a moderate-to-high probability of environmental degradation that are within or near the right-of-way for an S.R. 108 alternative or are hydraulically upgradient of an alternative. Sites of low concern are sites with a low-to-moderate probability of environmental degradation that are within about 1,000 feet of an alternative.

Two types of sites were eliminated from detailed evaluation: (1) sites with a low-to-moderate probability of contamination that are more than about 1,000 feet from the alternatives and (2) sites with a high probability of contamination that are within one-half mile of the alternatives but are hydraulically down-gradient from the alternatives.

The sites of greatest concern in the hazardous waste impact analysis area, based on a preliminary screening of site types and location, are listed in Exhibit 3.15-2 below and shown in Exhibit 3.15-3 below.

What is a hydraulic gradient?

A hydraulic gradient is the slope of the water table or aquifer. The hydraulic gradient influences the direction and rate of groundwater flow. If an alternative is down-gradient from a hazardous waste site, then groundwater likely flows from the site in the direction of the alternative.

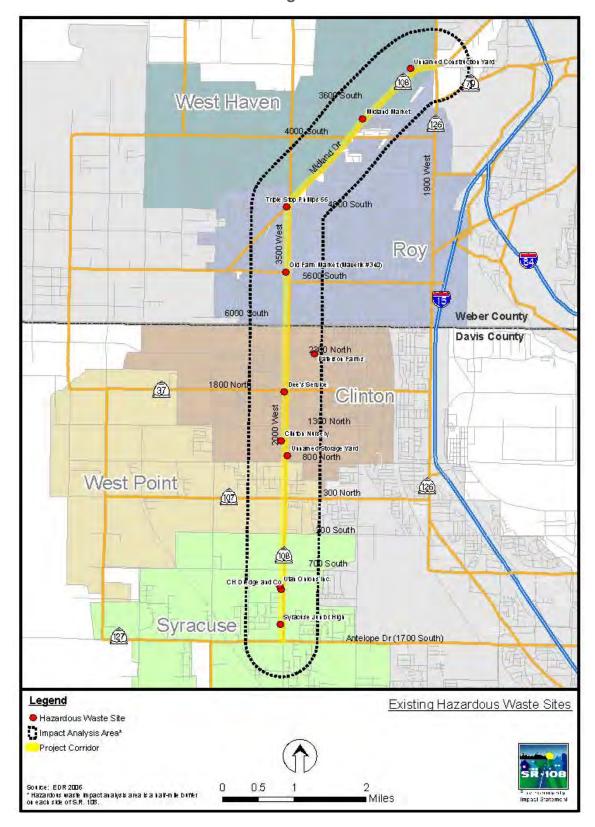
Exhibit 3.15-2: Potential Hazardous Waste Sites of Greatest Concern within One-Half Mile of S.R. 108

Site Name (Current Name, If Different)	Probability of Environmental Degradation	Location	Database/Site Description
Patterson Farms	Moderate	1613 West 2300 North, Clinton	LUST site closed in 1997, UST 2 of 2 tanks closed.
Old Farm Market (Maverik #340)	Low	5511 South 3500 West, Roy	FINDS, UST in operation.
Syracuse Junior High School	Low	1450 South 2000 West, Syracuse	FINDS.
Triple Stop Phillips 66	High	4795 South 3500 West, Roy	LUST currently monitored, UST in operation.
Dee's Service	Moderate	1793 North 2000 West, Clinton	LUST closed in 2002, UST 6 of 6 tanks closed, FINDS.
CH Dredge & Co. Inc (SCI)	Moderate	918 South 2000 West, Syracuse	LUST closed in 1996, UST 5 of 5 tanks closed, AST.
Utah Onions Inc.	Moderate	850 South 2000 West, Syracuse	UST 1 of 1 tank closed, FINDS.
Midland Market (Sinclair Gas)	Moderate	3805 S. Midland Drive, West Haven	UST 0 of 3 tanks closed.
Unnamed storage yard	Moderate	868 North 2000 West, Clinton	Farm storage yard with chemical storage tanks.
Unnamed construction yard	Moderate	2117 West 3300 South, Ogden	Construction company yard with AST.
Clinton Nursery	Moderate	1071 North 2000 West, Clinton	Gas AST identified during field survey.

Source: EDR 2006

Final Environmental mpact Statement

Exhibit 3.15-3: Existing Hazardous Waste Sites



3.16 Visual Resources

The aesthetic quality of a community depends on its visual resources—the physical features that make up the visible landscape, including land, water, vegetation, and human-made features such as buildings and roads. This analysis considers the visual resources that are present along S.R. 108. The impact analysis area for visual resources includes the area between Antelope Drive (S.R. 127) in Syracuse and 1900 West (S.R. 126) in West Haven, a distance of about 9.5 miles.

The visual impact analysis area for the S.R. 108 visual resources analysis includes S.R. 108 and its viewshed. The viewshed is influenced by existing topography, vegetation, and structures and diminishes with hilly topography and tall vegetation or structures.

The following sections provide a summary of the existing visual impact analysis area environment in terms of its visual resources (land form, land cover, and human-made elements). This summary is addressed from both the roadway user and viewer perspectives.

3.16.1 Geographic Setting of the Visual Impact **Analysis Area**

The visual impact analysis area lies within northern Utah's Great Salt Lake Basin along the eastern edge of the Basin and Range topographic region, which is characterized by a series of north-southtrending, linear, fault-block mountain ranges. To the east, the Wasatch Range extends in a north-south direction and consists of uplifted, fault-block mountains that form the western edge of the Rocky Mountains and the dramatic, abrupt, wall-like Wasatch Front that rises over 6,000 feet above the eastern edge of the valley floor. The Great Salt Lake, a remnant of ancient Lake Bonneville which at one time occupied much of Utah's Great Basin, lies about 3 miles to the west of S.R. 108 along with the Oquirrh Mountains, another north-south mountain range that stops at the south shore of the Great Salt Lake.

The visual impact analysis area is located in Davis and Weber Counties within the jurisdictions of Syracuse, West Point, Clinton, Roy, and West Haven. As shown in Photo 3.16-1 and Photo 3.16-2 below, the project area is largely urbanized. The primary land uses

What is the viewshed?

The viewshed is defined as all areas from which physical changes associated with the proposed alternatives could be seen.

are residential and commercial, although some agricultural areas still exist. Most of these agricultural areas are planned for development in the cities' land use plans (see Section 3.1, Land Use).



Photo 3.16-1. S.R. 108 and 4800 South Intersection Looking South



Photo 3.16-2. S.R. 108 in Clinton Looking North

3.16.2 **Background Views**

Background views from S.R. 108 include the Wasatch Mountain Range to the east and distant views of the Great Salt Lake and Oquirrh Mountains to the west. Long-range views of the Wasatch Range include Mount Ogden, Thurston Peak, and Ogden Canyon to the east and Willard Peak to the northeast.

3.16.3 **Foreground and Middle-Ground Views**

The foreground and middle-ground views in all directions generally include urban and suburban development, although the northern end of the S.R. 108 project has a more rural feel than elsewhere along S.R. 108. The foreground views in all directions for the visual impact analysis area are generally those of an urban environment, but there are some agricultural parcels along S.R. 108 as well. Most of the 9.5-mile corridor is bordered by residential areas that range from large-lot, single-family residences to high-density manufacturedhome communities. In fact, most middle-ground views are blocked by the houses that line S.R. 108 and the housing developments just off S.R. 108.

Vegetation along S.R. 108 is what one would expect to see in an urban and suburban environment. Landscaping typical of a residential environment is common. Some of the agricultural parcels are still being farmed, but many are idle. Pasture lands in the northern end of the S.R. 108 project are primarily flat, heavily disturbed saline playa cow pasture. These pastures have been heavily grazed.

Additional foreground views include a utility corridor, schools, and commercial retail developments including "big-box" stores such as Wal-Mart. Commercial and residential construction is occurring in several places along S.R. 108 resulting in typical construction views: cleared and graded parcels, construction equipment, construction fencing, and infrastructure materials such as water and sewer pipes. In some locations, new roadway infrastructure including curb, gutter, sidewalk, street lamps, and landscaping is visible (see Photo 3.16-3 and Photo 3.16-4 below).





Photo 3.16-3. S.R. 108 Just South of S.R. 127 (Antelope Drive) at the Southern Project Terminus Looking North



Photo 3.16-4. S.R. 108 in Syracuse near Syracuse Elementary School and Syracuse Junior High School Looking North